

# Testing the robustness of HCRs applied to Baltic pelagic stocks

Working Document in support to the STECF Expert Working Group 12-02 Management Plans - part 1

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# Testing the robustness of HCRs applied to Baltic pelagic stocks

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## Abstract

This work replies to a request from STECF EWG 11 15 to JRC to provide tests on the robustness of the target fishing mortality ( $F_{tgt}$ ) and biomass trigger ( $B_{trg}$ ) used on the harvest control rule (HCR) of the Baltic pelagic stocks. The main conclusion is that the successful candidates must assure  $B_{trg}$  is above the S/R break point and an exploitation level that is consistent with  $B_{trg}$  considering the stock dynamics.

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# 1 Introduction

The STECF EWG 11 15 required JRC to provide tests on the robustness of the target fishing mortality ( $F_{tgt}$ ) and biomass trigger ( $B_{trg}$ ) used on the harvest control rule (HCR) of the Baltic pelagic stocks. Such task should be carried out intersessionally and the results presented to the next STECF EWG dealing with the multispecies multiannual plan for the Baltic.

The objective of this work was to test with simulations the robustness of the reference points for use in the HCR of the pelagic stocks' in the Baltic, with regards to their hability to keep the stock above the biomass trigger and exploited at the foreseen level of fishing mortality.

The work was carried out with open source software, using the R environment (<http://r-project.org>) and FLR packages (<http://flr-project.org>) for data analysis, LaTeX (<http://ctan.org>) for report drafting and github for code management. The simulations are available on a request basis due to the large volume of data ( $\sim 24GB$ ). The code is available on a github repository (<http://github.com/ejardim/pelagicBRPtests>).

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Platform: x86_64-pc-linux-gnu (64-bit)

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 [5] LC_MONETARY=en_US.UTF-8  LC_MESSAGES=en_US.UTF-8
 [7] LC_PAPER=C               LC_NAME=C
 [9] LC_ADDRESS=C            LC_TELEPHONE=C
[11] LC_MEASUREMENT=en_US.UTF-8 LC_IDENTIFICATION=C

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[8] methods   base

other attached packages:
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[5] FLCore_2.5.0     lattice_0.20-0

loaded via a namespace (and not attached):
[1] cluster_1.14.1 stats4_2.14.2  tools_2.14.2
```

# 2 Material

This work used the assessments performed by HAWG<sup>1</sup> (2011) and WGBFAS<sup>2</sup> (2011) for sprat, Bothnian Sea herring, Gulf of Riga herring, Central Baltic herring and Western Baltic spring spawning herring. The assessment results were taken as a starting point.

The stock-recruitment (S/R) model used followed the decisions made by WKMAMPEL<sup>3</sup> (2009) about using a segmented regression with pre specified break point values. Recruitment above the break point was taken as the geometric mean over the time series.

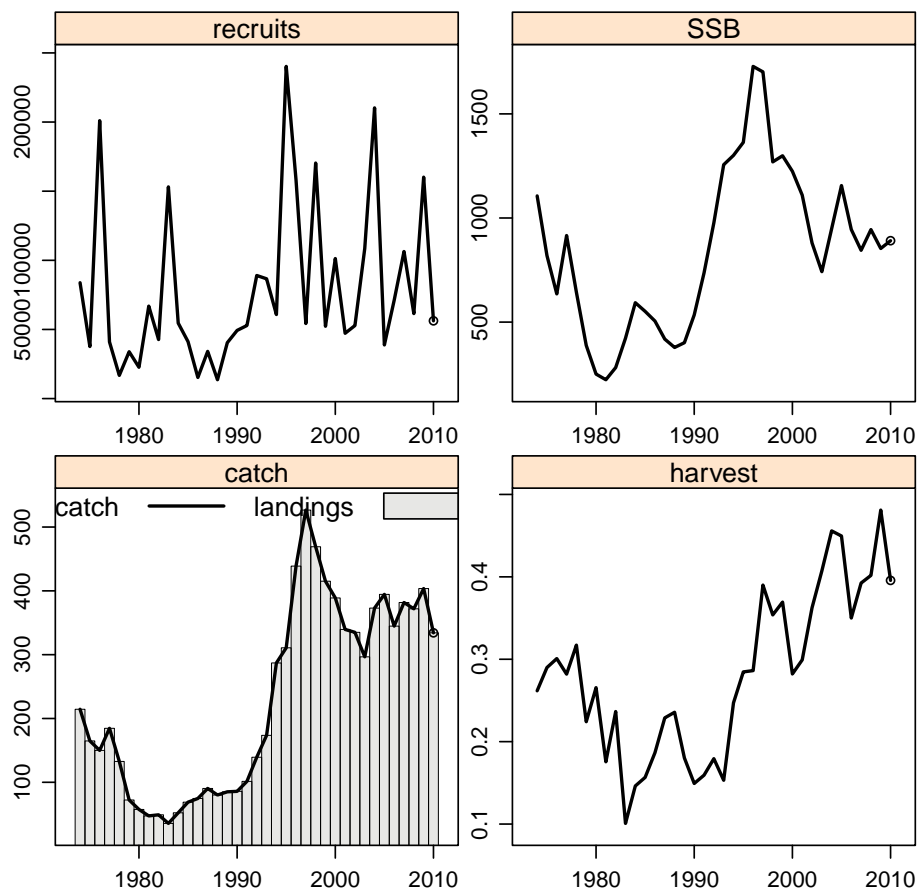
Figures 1 to 5 present the assessment results and the S/R models used for each species.

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<sup>1</sup>Report of the Herring Assessment Working Group for the area South of 62 deg N. 16-24 March 2011, ICES Headquarters, Copenhagen. ICES CM 2011/ACOM:06

<sup>2</sup>Report of the Baltic Fisheries Assessment Working Group. 12-19 April 2011, ICES Headquarters, Copenhagen. ICES CM 2011/ACOM:10

<sup>3</sup>Report of the Workshop on Multi-annual management of Pelagic Fish Stocks in the Baltic. 23-27 February 2009, ICES Headquarters, Copenhagen. ICES CM 2009/ACOM:38



### Segmented regression

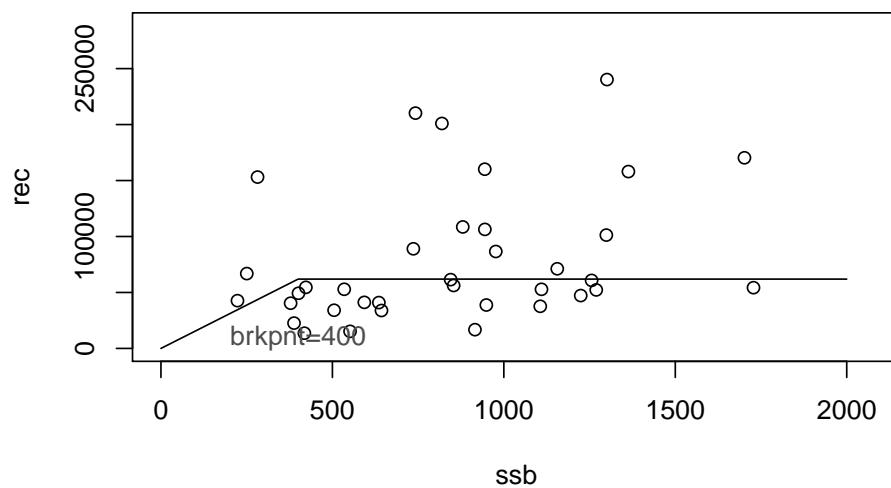
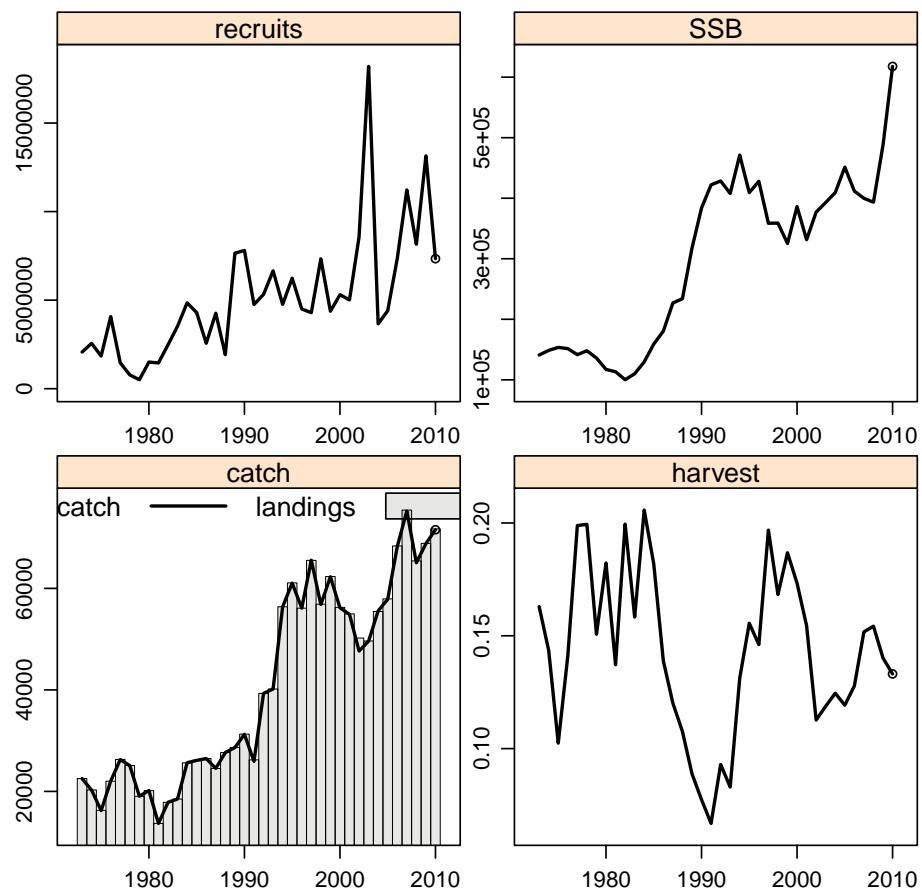


Figure 1: Baltic sprat



### Segmented regression

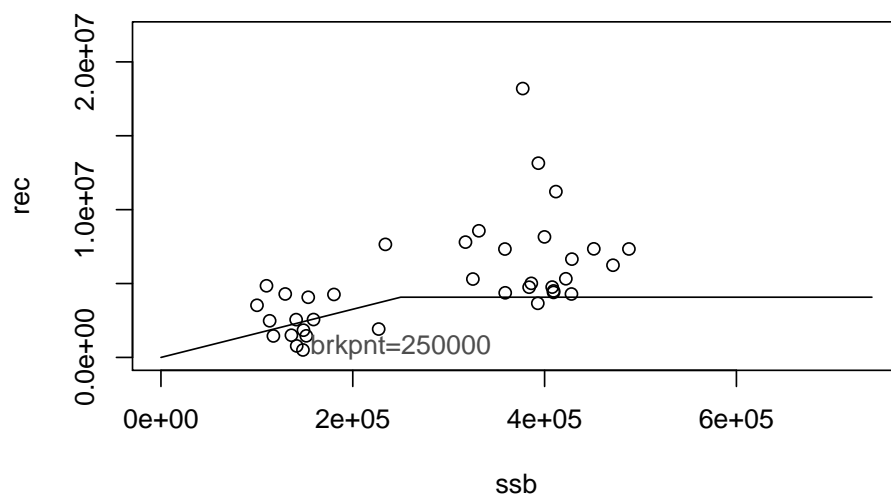
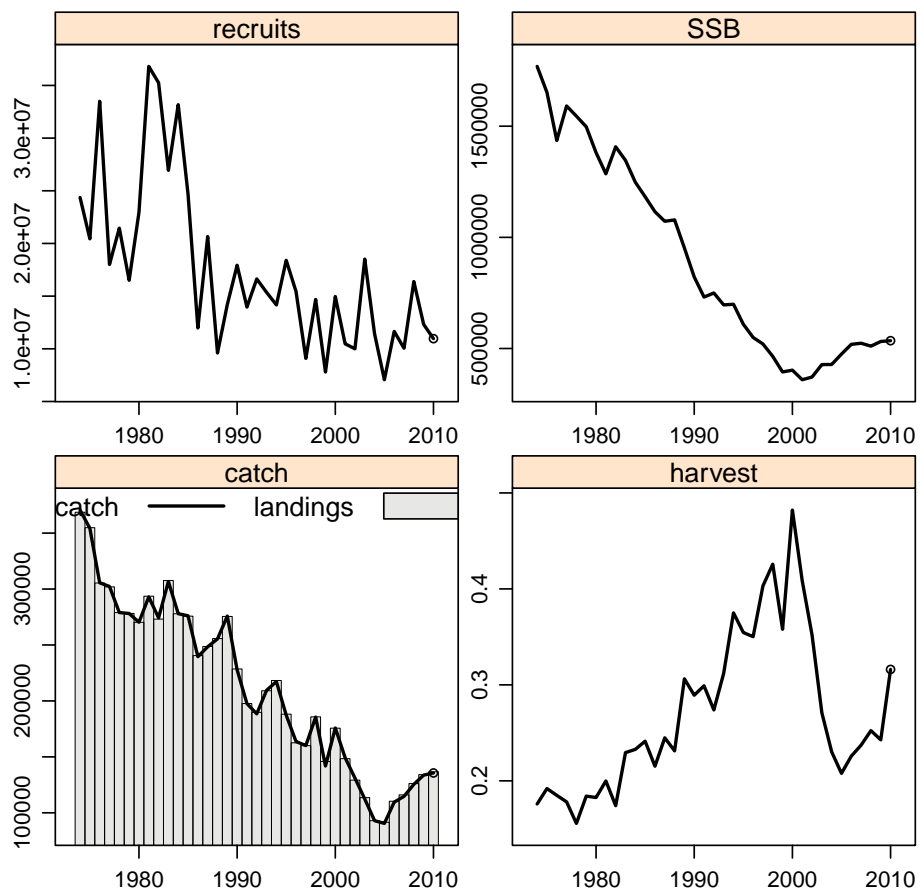


Figure 2: Bothnian Sea Herring



### Segmented regression

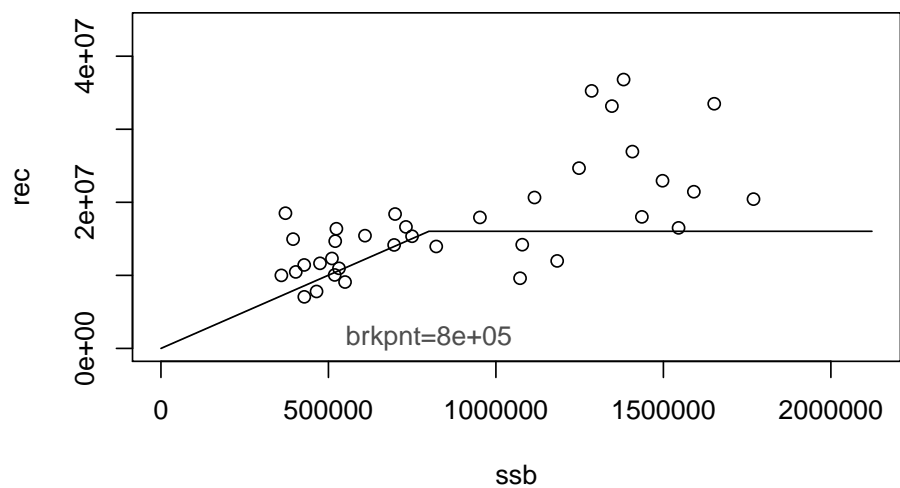
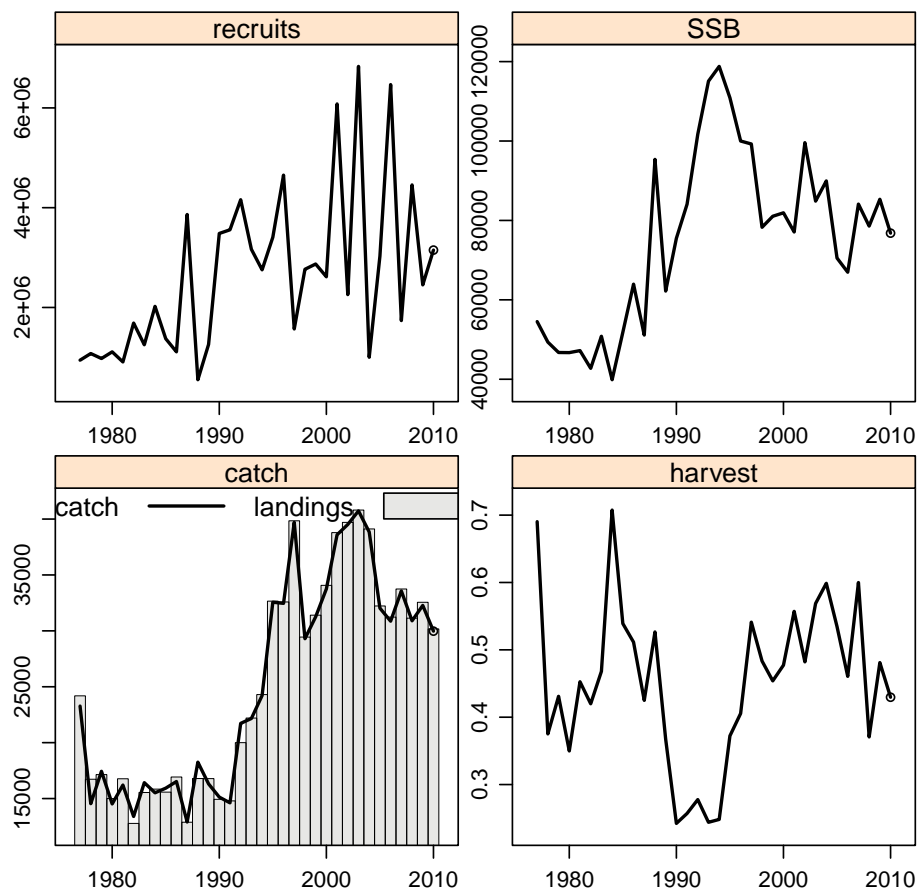


Figure 3: Central Baltic Herring



### Segmented regression

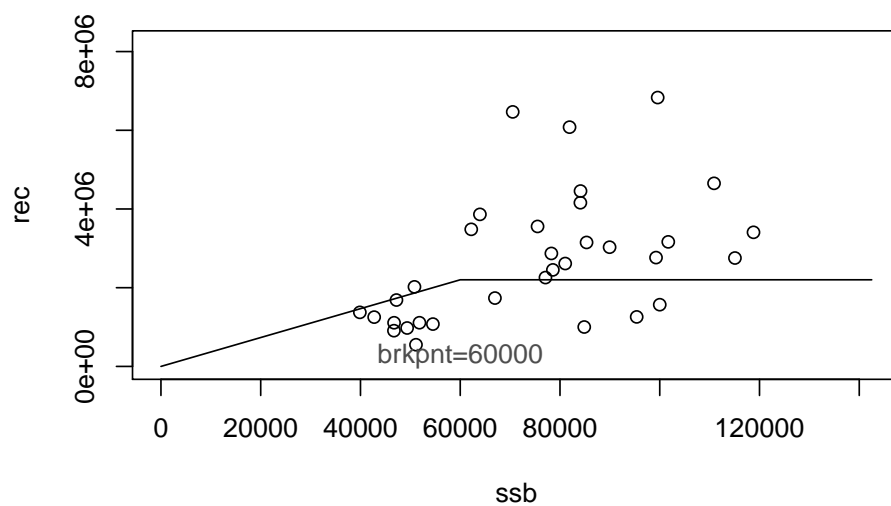


Figure 4: Gulf of Riga Herring



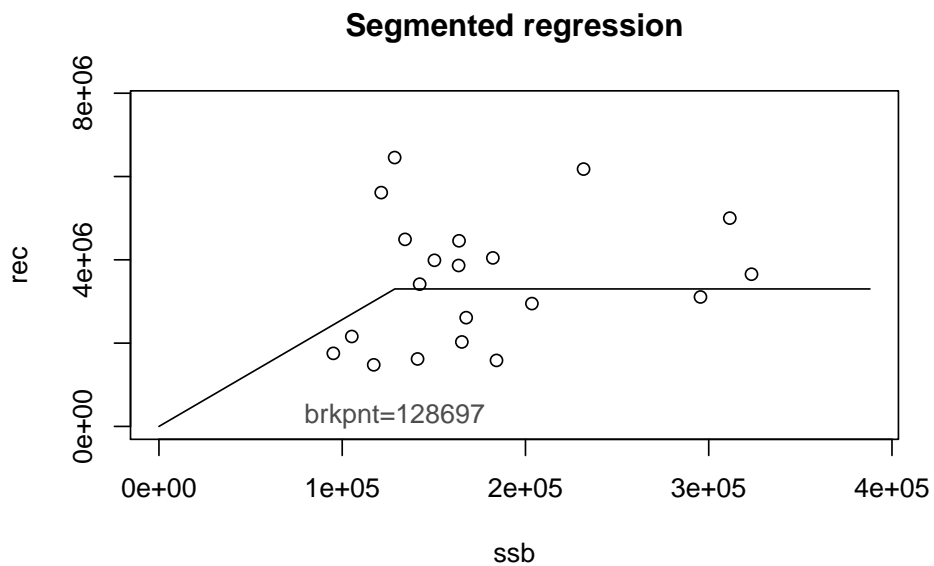
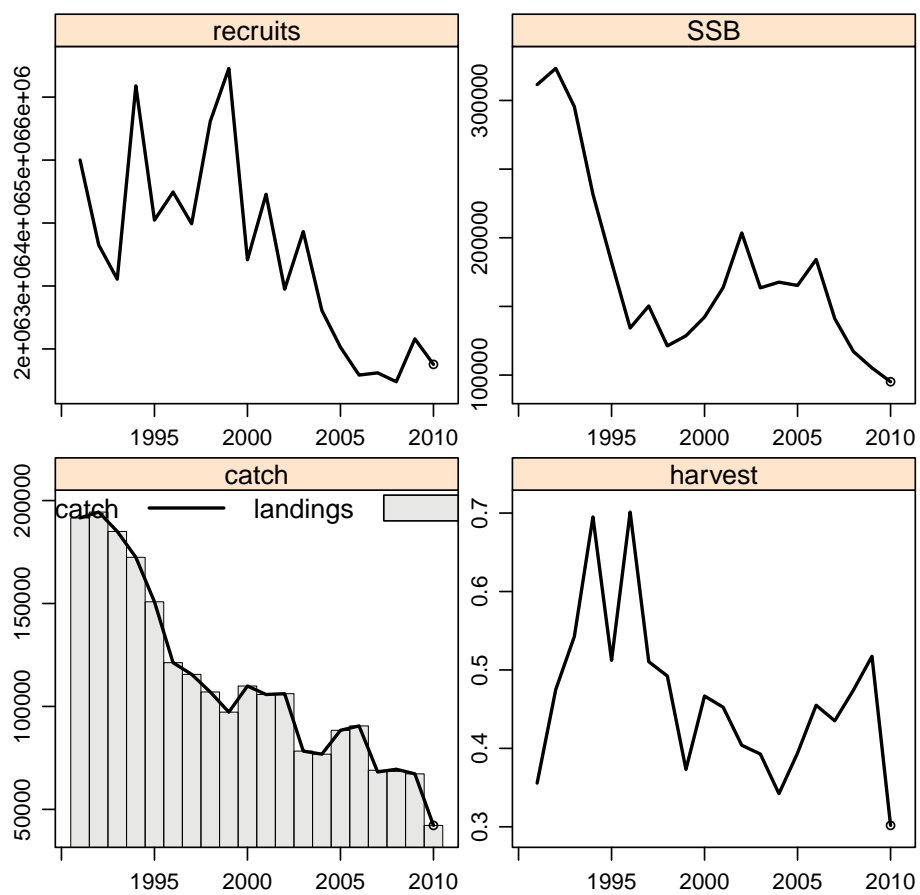


Figure 5: Western Baltic Spring Spawning Herring

### 3 Methods

#### 3.1 Stock Simulation

Stocks were simulated by adding additional variation to estimates of recruitment and  $F$  at age from the original stock assessment. The simulations of recruitment and  $F$  (and the current assumption for  $M$ ) were used to project  $N$  at age using the standard equation  $N_{a+1,y+1} = N_{ay}e^{-F_{ay}-M_{ay}}$ . Recruitment in year  $y$  was simulated using a log-normal distribution where the median was the estimate of recruitment for that year and the variance on the log scale was  $CV^2$ .  $F$  at age in year  $y$  was simulated using a multivariate log-normal distribution where the median was the estimate of  $F$  at age for that year ( $\hat{\mathbf{F}}_{\cdot y}$ ) and the covariance on the log scale given by  $CV^2 \times \text{Cor}(\hat{\mathbf{F}}_{\cdot y})$ , so that correlation across ages reflects that in the original estimate of  $F$ .

#### 3.2 HCR

The harvest control rule (HCR) applied is described below. Considering the objective of the work, only one HCR was tested with distinct parameters.

$$\begin{aligned} F_{Y+1} &= F_{target} & \text{if } SSB_{Y+1} > B_{trigger} \\ F_{Y+1} &= F_{target} SSB_{Y+1} B_{trigger}^{-1} & \text{if } SSB_{Y+1} < B_{trigger} \end{aligned} \tag{1}$$

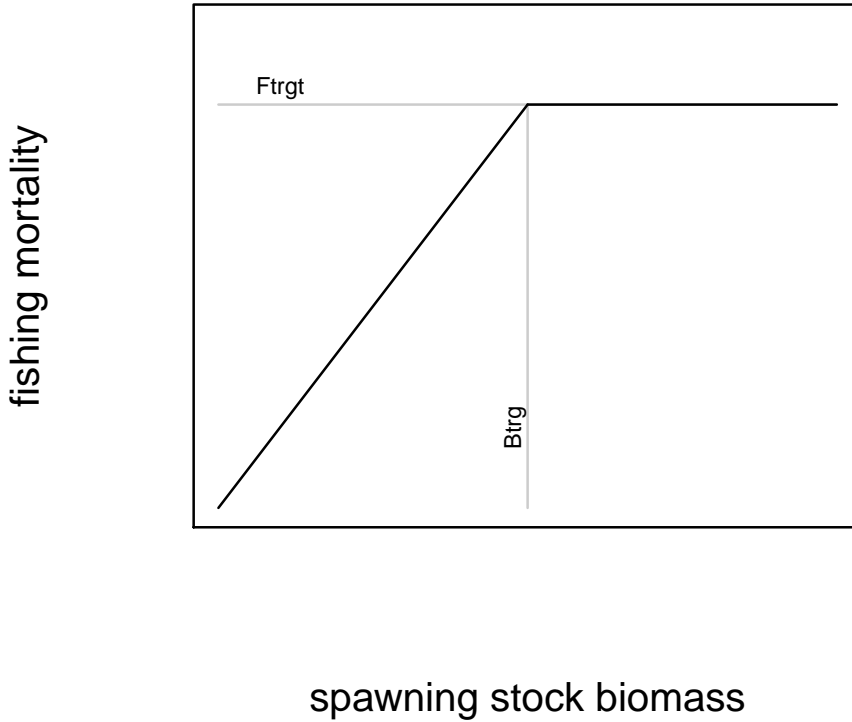


Figure 6: HCR

### 3.3 Scenarios

Scenarios were defined based on distinct values of  $B_{trigger}$ ,  $F_{target}$ , implementation error and variability on  $[F]$  and  $[N]$ . The scenarios are described below for each stock.

Table 1: Simulation scenarios

stock	Ftarget	Btrigger (ton)	F and N CV	Imp.Error
sprat	0.3, 0.4	0, 400, 600, 800	0.1, 0.2, 0.3	1, 1.05, 1.1, 1.2
BS herring	0.14, 0.16, 0.21	0, 100, 200, 300, 400	0.1, 0.2, 0.3	1, 1.05, 1.1, 1.2
CB herring	0.15, 0.20, 0.25	0, 500, 700, 900, 1100, 1300	0.1, 0.2, 0.3	1, 1.05, 1.1, 1.2
GoR herring	0.20, 0.25, 0.30, 0.35, 0.40	0, 50, 60, 70, 80	0.1, 0.2, 0.3	1, 1.05, 1.1, 1.2
WBSS herring	0.20, 0.25, 0.30, 0.35, 0.40	0, 100, 120, 140, 160, 180, 200	0.1, 0.2, 0.3	1, 1.05, 1.1, 1.2

The same simulations were run using other S/R relationships, Ricker and Beverton and Holt. A preliminary analysis showed the results to be very similar to the Segmented regression S/R. The major conclusion is that the most important factors are the HCR parameters.

## 4 Results

Results are presented in two forms, a "risk analysis" plot and a table with detailed metrics. Both are computed in 2029, when the stocks are expected to reach equilibrium. The figures show a matrix of plots with  $B_{trg}$  in the x axis,  $F_{trgt}$  in the y axis,  $CV$  in rows and implementation error in columns. The triangles' size represent  $P[SSB_{2029} < B_{trg}]$ , where large triangles are 1 and small triangles 0. The triangles pointing up represent  $P[F_{2029} > F_{trgt}] > 0.5$  while triangles pointing down the opposite. The red colour represents  $P[SSB_{2029} < B_{loss}] > 0.05$  while black is the opposite. In summary, the best option is a small, black triangle pointing down, while the worst is a large, red triangle pointing up.

### 4.1 Inconsistencies between HCR and stock dynamics

The results showed that the conditions with major effect on the results were (i) the mis-match between  $F_{trgt}$  and  $B_{trg}$  when the exploitation level resulted in an equilibrium SSB below  $B_{trg}$ , and (ii)  $B_{trg}$  levels below the break point of the S/R. To better illustrate these effects two examples are presented.

The effect of having a  $B_{trg}$  or  $F_{trgt}$  that are very high in relation to the stock dynamics, can be seen in the following example. Figure 7 shows a scenario for Sprat with  $F_{trgt} = 0.4$  and  $B_{trg} = 0$ , while figure 8 shows the scenario with same  $F_{trgt}$  but  $B_{trg} = 800$ . It can be seen that  $B_{trg}$  pushes  $F$  down, making it, in average, below  $F_{trgt}$ , but still is not enough to get  $SSB$  above  $B_{trg}$ . The overall picture is that  $F$  is below  $F_{trgt}$  but also  $SSB$  is below  $B_{trg}$ . In fact looking at the history of the stock there are indications that  $F = 0.4$  is too high.

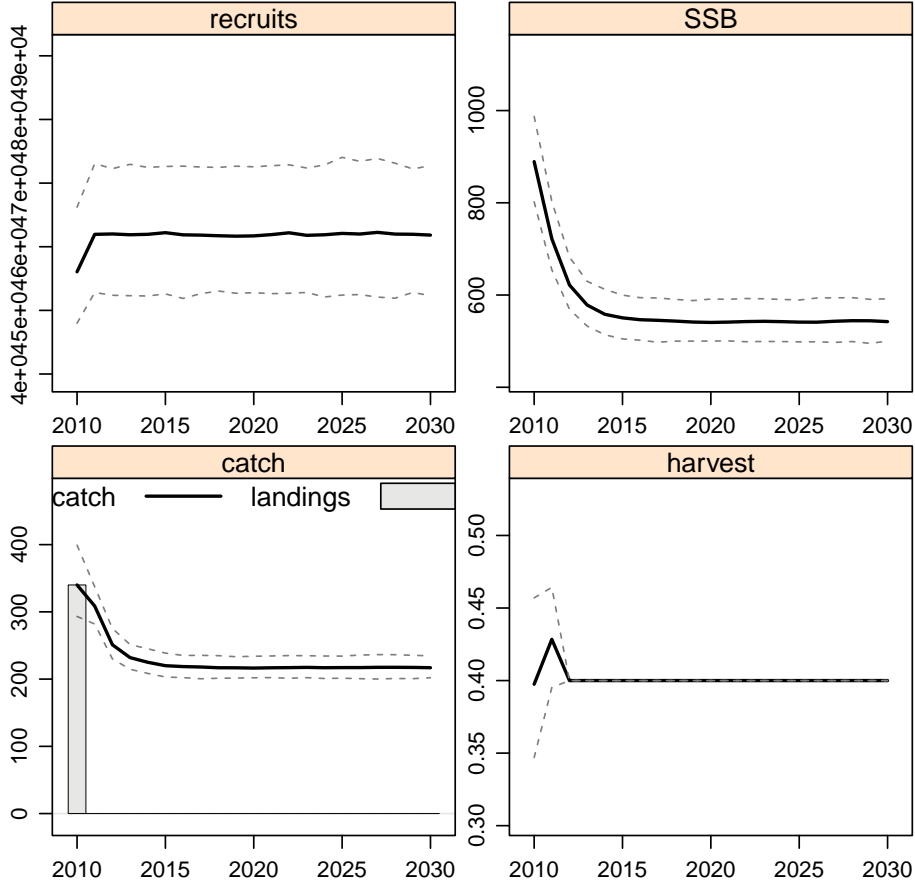


Figure 7: Sprat scenario:  $F_{trgt} = 0.4$  and  $B_{trg} = 0$

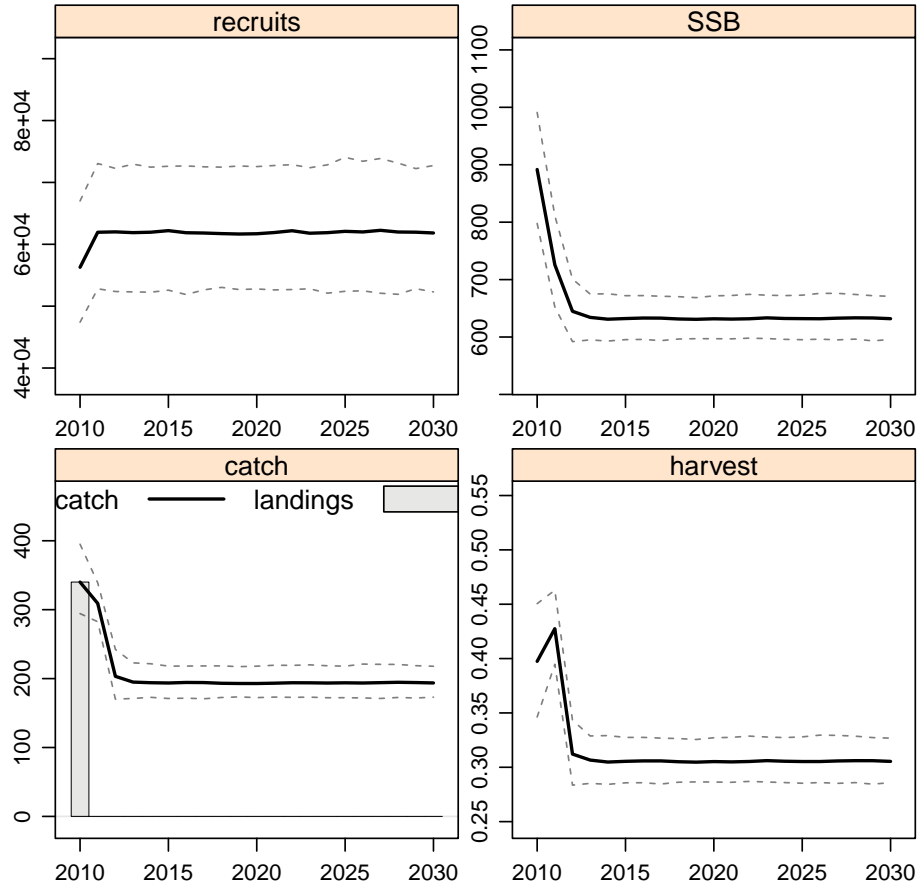


Figure 8: Sprat scenario:  $F_{trgt} = 0.4$  and  $B_{trg} = 800$

Regarding scenarios where  $B_{trg}$  is below the S/R break point, consider the example below for Bothnian Sea herring with  $F_{trgt} = 0.21$  and  $B_{trg} = 200000$  (Figure 9). It's clear that such situation leads the stock to the slope of the S/R relationship, a dangerous area that the HCR is supposed to avoid.

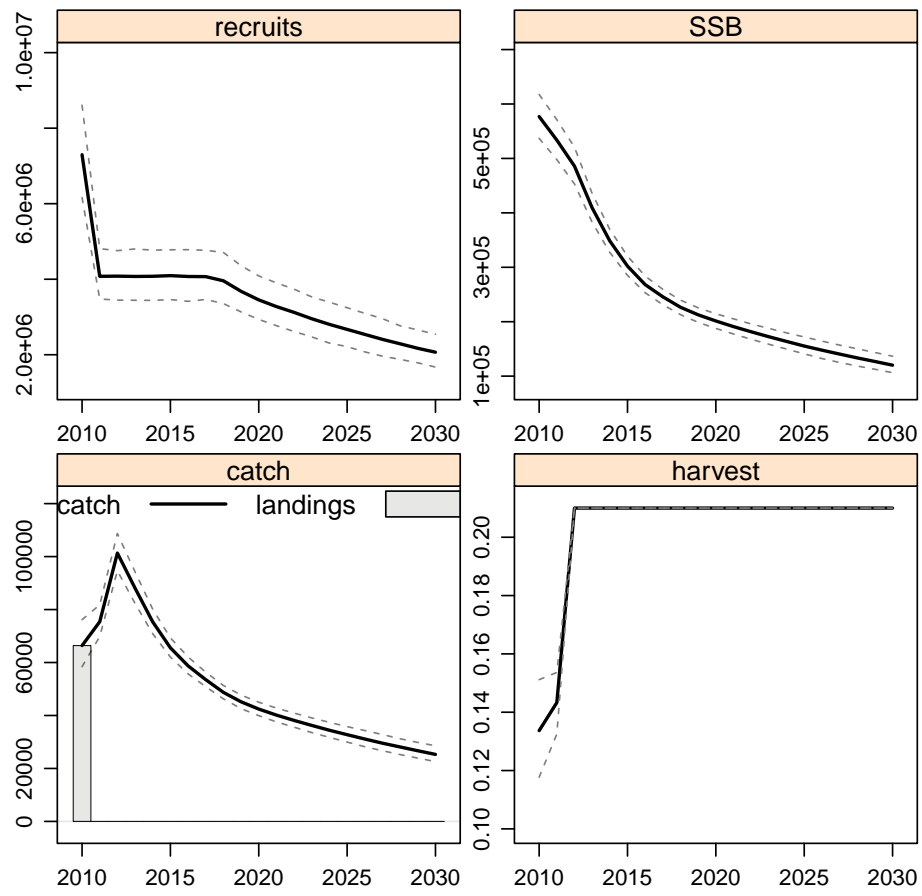


Figure 9: Bothnian Sea herring scenario:  $F_{trgt} = 0.21$  and  $B_{trg} = 100000$

4.2 Risk plots and detailed tables

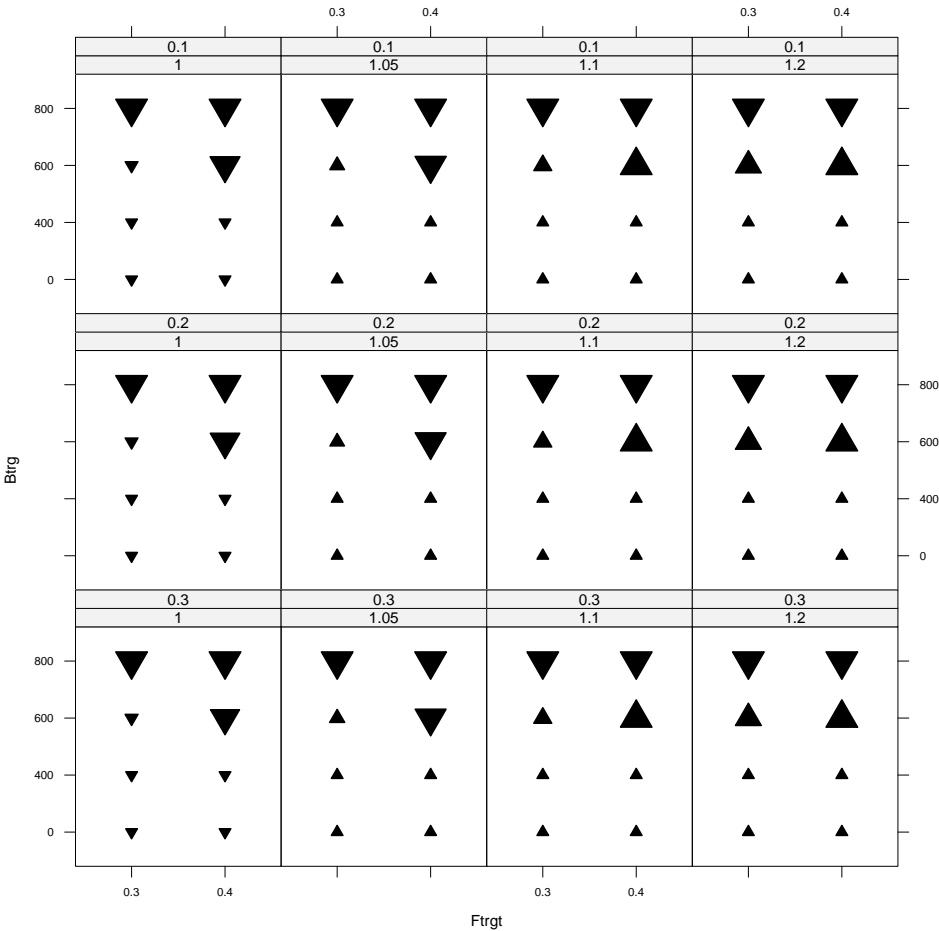


Figure 10: Baltic sprat risk analysis

Table 2: Sprat - metrics measured in 2029

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
1	0.1	0.3	0	1.00	0.36	0.00	0	0.30	640	4002
2	0.1	0.4	0	1.00	0.28	0.00	0	0.40	544	4462
3	0.1	0.3	400	1.00	0.34	0.00	0	0.30	640	4052
4	0.1	0.4	400	1.00	0.31	0.00	0	0.40	544	4475
5	0.1	0.3	600	1.00	0.30	0.09	0	0.30	641	4041
6	0.1	0.4	600	1.00	0.02	0.94	0	0.37	566	4287
7	0.1	0.3	800	1.00	0.00	1.00	0	0.26	694	3631
8	0.1	0.4	800	1.00	0.00	1.00	0	0.31	633	4022
9	0.2	0.3	0	1.00	0.33	0.00	0	0.30	640	3930
10	0.2	0.4	0	1.00	0.32	0.00	0	0.40	543	4526
11	0.2	0.3	400	1.00	0.32	0.00	0	0.30	641	4246
12	0.2	0.4	400	1.00	0.32	0.00	0	0.40	544	4488
13	0.2	0.3	600	1.00	0.26	0.10	0	0.30	641	4010
14	0.2	0.4	600	1.00	0.02	0.93	0	0.37	566	4517
15	0.2	0.3	800	1.00	0.00	1.00	0	0.26	693	3676
16	0.2	0.4	800	1.00	0.00	1.00	0	0.31	633	4123
17	0.3	0.3	0	1.00	0.35	0.00	0	0.30	640	3886
18	0.3	0.4	0	1.00	0.32	0.00	0	0.40	543	4470
19	0.3	0.3	400	1.00	0.32	0.00	0	0.30	639	4138
20	0.3	0.4	400	1.00	0.32	0.00	0	0.40	543	4269
21	0.3	0.3	600	1.00	0.28	0.11	0	0.30	639	4064
22	0.3	0.4	600	1.00	0.03	0.91	0	0.37	566	4418
23	0.3	0.3	800	1.00	0.00	1.00	0	0.26	693	4145
24	0.3	0.4	800	1.00	0.00	1.00	0	0.31	633	4054
25	0.1	0.3	0	1.05	1.00	0.00	0	0.32	621	4082
26	0.1	0.4	0	1.05	1.00	0.00	0	0.42	525	4641
27	0.1	0.3	400	1.05	1.00	0.00	0	0.32	622	4194
28	0.1	0.4	400	1.05	1.00	0.00	0	0.42	525	4595
29	0.1	0.3	600	1.05	0.97	0.24	0	0.32	622	4091
30	0.1	0.4	600	1.05	0.25	0.99	0	0.39	553	4393
31	0.1	0.3	800	1.05	0.00	1.00	0	0.27	681	3858
32	0.1	0.4	800	1.05	0.00	1.00	0	0.32	620	4028
33	0.2	0.3	0	1.05	1.00	0.00	0	0.32	622	4181
34	0.2	0.4	0	1.05	1.00	0.00	0	0.42	524	4541
35	0.2	0.3	400	1.05	1.00	0.00	0	0.32	622	4265
36	0.2	0.4	400	1.05	1.00	0.00	0	0.42	525	4646
37	0.2	0.3	600	1.05	0.98	0.22	0	0.32	623	3900
38	0.2	0.4	600	1.05	0.27	0.98	0	0.39	552	4417
39	0.2	0.3	800	1.05	0.00	1.00	0	0.27	680	3726
40	0.2	0.4	800	1.05	0.00	1.00	0	0.32	619	4063



Table 2: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
41	0.3	0.3	0	1.05	1.00	0.00	0	0.32	622	4244
42	0.3	0.4	0	1.05	1.00	0.00	0	0.42	524	4444
43	0.3	0.3	400	1.05	1.00	0.00	0	0.32	622	4011
44	0.3	0.4	400	1.05	1.00	0.00	0	0.42	524	4584
45	0.3	0.3	600	1.05	0.97	0.26	0	0.32	621	4363
46	0.3	0.4	600	1.05	0.26	0.98	0	0.39	553	4416
47	0.3	0.3	800	1.05	0.00	1.00	0	0.27	680	3665
48	0.3	0.4	800	1.05	0.00	1.00	0	0.32	620	4400
49	0.1	0.3	0	1.10	1.00	0.00	0	0.33	604	4191
50	0.1	0.4	0	1.10	1.00	0.00	0	0.45	506	4639
51	0.1	0.3	400	1.10	1.00	0.00	0	0.33	603	4227
52	0.1	0.4	400	1.10	1.00	0.00	0	0.45	505	4619
53	0.1	0.3	600	1.10	1.00	0.43	0	0.33	605	4113
54	0.1	0.4	600	1.10	0.57	1.00	0	0.40	541	4445
55	0.1	0.3	800	1.10	0.02	1.00	0	0.28	668	3930
56	0.1	0.4	800	1.10	0.00	1.00	0	0.33	607	4094
57	0.2	0.3	0	1.10	1.00	0.00	0	0.33	603	4196
58	0.2	0.4	0	1.10	1.00	0.00	0	0.45	506	4962
59	0.2	0.3	400	1.10	1.00	0.00	0	0.33	604	4296
60	0.2	0.4	400	1.10	1.00	0.00	0	0.45	507	4590
61	0.2	0.3	600	1.10	1.00	0.44	0	0.33	604	3993
62	0.2	0.4	600	1.10	0.56	1.00	0	0.40	540	4419
63	0.2	0.3	800	1.10	0.02	1.00	0	0.28	668	3853
64	0.2	0.4	800	1.10	0.00	1.00	0	0.33	607	4174
65	0.3	0.3	0	1.10	1.00	0.00	0	0.33	604	4556
66	0.3	0.4	0	1.10	1.00	0.00	0	0.45	505	4748
67	0.3	0.3	400	1.10	1.00	0.00	0	0.33	603	4171
68	0.3	0.4	400	1.10	1.00	0.00	0	0.45	506	4428
69	0.3	0.3	600	1.10	1.00	0.44	0	0.33	605	4334
70	0.3	0.4	600	1.10	0.57	1.00	0	0.40	540	4723
71	0.3	0.3	800	1.10	0.03	1.00	0	0.28	668	3765
72	0.3	0.4	800	1.10	0.00	1.00	0	0.33	607	4626
73	0.1	0.3	0	1.20	1.00	0.00	0	0.37	569	4322
74	0.1	0.4	0	1.20	1.00	0.00	0	0.50	473	4876
75	0.1	0.3	400	1.20	1.00	0.00	0	0.37	570	4286
76	0.1	0.4	400	1.20	1.00	0.00	0	0.50	472	4873
77	0.1	0.3	600	1.20	1.00	0.80	0	0.36	578	4226
78	0.1	0.4	600	1.20	0.95	1.00	0	0.43	518	4531
79	0.1	0.3	800	1.20	0.38	1.00	0	0.30	643	3920
80	0.1	0.4	800	1.20	0.00	1.00	0	0.35	585	4266

Table 2: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
81	0.2	0.3	0	1.20	1.00	0.00	0	0.37	569	4537
82	0.2	0.4	0	1.20	1.00	0.00	0	0.50	472	4654
83	0.2	0.3	400	1.20	1.00	0.00	0	0.37	571	4397
84	0.2	0.4	400	1.20	1.00	0.00	0	0.50	472	4775
85	0.2	0.3	600	1.20	1.00	0.80	0	0.36	577	4165
86	0.2	0.4	600	1.20	0.94	1.00	0	0.43	517	4621
87	0.2	0.3	800	1.20	0.39	1.00	0	0.30	645	4060
88	0.2	0.4	800	1.20	0.00	1.00	0	0.35	583	4368
89	0.3	0.3	0	1.20	1.00	0.00	0	0.37	570	4311
90	0.3	0.4	0	1.20	1.00	0.00	0	0.50	471	4681
91	0.3	0.3	400	1.20	1.00	0.00	0	0.37	568	4922
92	0.3	0.4	400	1.20	1.00	0.00	0	0.50	471	4981
93	0.3	0.3	600	1.20	1.00	0.80	0	0.36	576	4290
94	0.3	0.4	600	1.20	0.92	1.00	0	0.43	517	4707
95	0.3	0.3	800	1.20	0.37	1.00	0	0.30	644	3904
96	0.3	0.4	800	1.20	0.00	1.00	0	0.35	584	4240

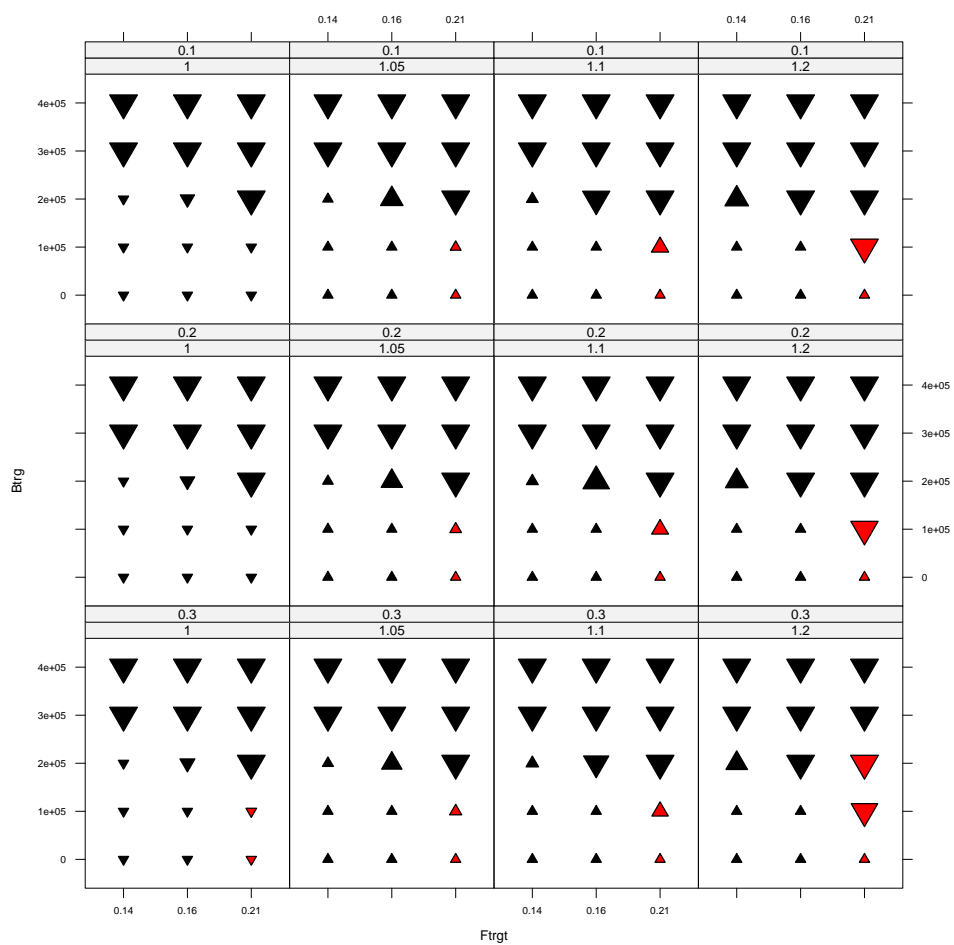


Figure 11: Bothnian Sea herring risk analysis

Table 3: Bothnian Sea herring - metrics measured in 2029

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
1	0.1	0.14	0e + 00	1.00	0.32	0.00	0.00	0.14	239869	910286
2	0.1	0.16	0e + 00	1.00	0.13	0.00	0.00	0.16	205648	936501
3	0.1	0.21	0e + 00	1.00	0.36	0.00	0.00	0.21	126994	1004832
4	0.1	0.14	1e + 05	1.00	0.30	0.00	0.00	0.14	240231	882624
5	0.1	0.16	1e + 05	1.00	0.14	0.00	0.00	0.16	205581	913362
6	0.1	0.21	1e + 05	1.00	0.38	0.00	0.00	0.21	126891	981729
7	0.1	0.14	2e + 05	1.00	0.31	0.00	0.00	0.14	240364	920629
8	0.1	0.16	2e + 05	1.00	0.10	0.33	0.00	0.16	205529	926852
9	0.1	0.21	2e + 05	1.00	0.00	1.00	0.00	0.16	152870	960030
10	0.1	0.14	3e + 05	1.00	0.00	1.00	0.00	0.12	261478	888200
11	0.1	0.16	3e + 05	1.00	0.00	1.00	0.00	0.13	248332	893758
12	0.1	0.21	3e + 05	1.00	0.00	1.00	0.00	0.14	206063	946726
13	0.1	0.14	4e + 05	1.00	0.00	1.00	0.00	0.10	286875	826978
14	0.1	0.16	4e + 05	1.00	0.00	1.00	0.00	0.11	275331	834469
15	0.1	0.21	4e + 05	1.00	0.00	1.00	0.00	0.13	251072	876105
16	0.2	0.14	0e + 00	1.00	0.29	0.00	0.00	0.14	240450	906569
17	0.2	0.16	0e + 00	1.00	0.13	0.00	0.00	0.16	205588	928906
18	0.2	0.21	0e + 00	1.00	0.37	0.00	0.04	0.21	127073	965495
19	0.2	0.14	1e + 05	1.00	0.33	0.00	0.00	0.14	240644	903200
20	0.2	0.16	1e + 05	1.00	0.15	0.00	0.00	0.16	205111	1020204
21	0.2	0.21	1e + 05	1.00	0.34	0.01	0.02	0.21	127902	950521
22	0.2	0.14	2e + 05	1.00	0.31	0.00	0.00	0.14	240668	913838
23	0.2	0.16	2e + 05	1.00	0.08	0.36	0.00	0.16	206253	929118
24	0.2	0.21	2e + 05	1.00	0.00	1.00	0.00	0.16	152926	943127
25	0.2	0.14	3e + 05	1.00	0.00	1.00	0.00	0.12	261222	947766
26	0.2	0.16	3e + 05	1.00	0.00	1.00	0.00	0.13	248123	1014257
27	0.2	0.21	3e + 05	1.00	0.00	1.00	0.00	0.14	206095	990164
28	0.2	0.14	4e + 05	1.00	0.00	1.00	0.00	0.10	287214	836751
29	0.2	0.16	4e + 05	1.00	0.00	1.00	0.00	0.11	274991	887755
30	0.2	0.21	4e + 05	1.00	0.00	1.00	0.00	0.13	250461	897210
31	0.3	0.14	0e + 00	1.00	0.26	0.00	0.00	0.14	240718	957290
32	0.3	0.16	0e + 00	1.00	0.12	0.00	0.00	0.16	205680	935764
33	0.3	0.21	0e + 00	1.00	0.36	0.00	0.10	0.21	126879	1135554
34	0.3	0.14	1e + 05	1.00	0.28	0.00	0.00	0.14	240508	822764
35	0.3	0.16	1e + 05	1.00	0.12	0.00	0.00	0.16	204878	1036230
36	0.3	0.21	1e + 05	1.00	0.35	0.04	0.11	0.21	127491	1010805
37	0.3	0.14	2e + 05	1.00	0.28	0.01	0.00	0.14	240648	942141
38	0.3	0.16	2e + 05	1.00	0.08	0.38	0.00	0.16	205397	965719
39	0.3	0.21	2e + 05	1.00	0.00	1.00	0.00	0.16	153447	954730
40	0.3	0.14	3e + 05	1.00	0.00	1.00	0.00	0.12	261579	935800

Table 3: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
41	0.3	0.16	$3e+05$	1.00	0.00	1.00	0.00	0.13	248214	976635
42	0.3	0.21	$3e+05$	1.00	0.00	1.00	0.00	0.14	206750	859952
43	0.3	0.14	$4e+05$	1.00	0.00	1.00	0.00	0.10	286805	832419
44	0.3	0.16	$4e+05$	1.00	0.00	1.00	0.00	0.11	275527	857994
45	0.3	0.21	$4e+05$	1.00	0.00	1.00	0.00	0.13	250955	937953
46	0.1	0.14	$0e+00$	1.05	1.00	0.00	0.00	0.15	227738	915188
47	0.1	0.16	$0e+00$	1.05	1.00	0.00	0.00	0.17	189802	987607
48	0.1	0.21	$0e+00$	1.05	1.00	0.00	0.07	0.22	112582	988163
49	0.1	0.14	$1e+05$	1.05	1.00	0.00	0.00	0.15	227566	925224
50	0.1	0.16	$1e+05$	1.05	1.00	0.00	0.00	0.17	189159	980567
51	0.1	0.21	$1e+05$	1.05	0.99	0.06	0.07	0.22	112118	982457
52	0.1	0.14	$2e+05$	1.05	1.00	0.01	0.00	0.15	227663	923040
53	0.1	0.16	$2e+05$	1.05	0.58	0.79	0.00	0.16	191532	983879
54	0.1	0.21	$2e+05$	1.05	0.00	1.00	0.00	0.16	145182	1002897
55	0.1	0.14	$3e+05$	1.05	0.00	1.00	0.00	0.13	256877	900738
56	0.1	0.16	$3e+05$	1.05	0.00	1.00	0.00	0.13	240872	899843
57	0.1	0.21	$3e+05$	1.05	0.00	1.00	0.00	0.14	197924	974607
58	0.1	0.14	$4e+05$	1.05	0.00	1.00	0.00	0.10	282304	854964
59	0.1	0.16	$4e+05$	1.05	0.00	1.00	0.00	0.11	270782	892029
60	0.1	0.21	$4e+05$	1.05	0.00	1.00	0.00	0.13	244372	894245
61	0.2	0.14	$0e+00$	1.05	1.00	0.00	0.00	0.15	228266	918416
62	0.2	0.16	$0e+00$	1.05	1.00	0.00	0.00	0.17	190389	936150
63	0.2	0.21	$0e+00$	1.05	1.00	0.00	0.16	0.22	112572	941322
64	0.2	0.14	$1e+05$	1.05	1.00	0.00	0.00	0.15	227110	930829
65	0.2	0.16	$1e+05$	1.05	1.00	0.00	0.00	0.17	190577	998232
66	0.2	0.21	$1e+05$	1.05	0.94	0.13	0.17	0.22	112736	1017905
67	0.2	0.14	$2e+05$	1.05	1.00	0.03	0.00	0.15	228412	923162
68	0.2	0.16	$2e+05$	1.05	0.56	0.74	0.00	0.16	191797	957861
69	0.2	0.21	$2e+05$	1.05	0.00	1.00	0.00	0.16	145380	986744
70	0.2	0.14	$3e+05$	1.05	0.00	1.00	0.00	0.13	256693	981061
71	0.2	0.16	$3e+05$	1.05	0.00	1.00	0.00	0.13	241044	946411
72	0.2	0.21	$3e+05$	1.05	0.00	1.00	0.00	0.14	197879	965615
73	0.2	0.14	$4e+05$	1.05	0.00	1.00	0.00	0.10	282241	895183
74	0.2	0.16	$4e+05$	1.05	0.00	1.00	0.00	0.11	270707	878899
75	0.2	0.21	$4e+05$	1.05	0.00	1.00	0.00	0.13	244354	911916
76	0.3	0.14	$0e+00$	1.05	1.00	0.00	0.00	0.15	227731	860310
77	0.3	0.16	$0e+00$	1.05	1.00	0.00	0.00	0.17	190519	933137
78	0.3	0.21	$0e+00$	1.05	1.00	0.00	0.28	0.22	111944	984532
79	0.3	0.14	$1e+05$	1.05	1.00	0.00	0.00	0.15	227603	1004192
80	0.3	0.16	$1e+05$	1.05	1.00	0.00	0.00	0.17	190349	1040587

Table 3: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
81	0.3	0.21	1e + 05	1.05	0.91	0.18	0.25	0.22	112545	974519
82	0.3	0.14	2e + 05	1.05	0.98	0.07	0.00	0.15	226971	985339
83	0.3	0.16	2e + 05	1.05	0.55	0.69	0.00	0.16	191888	996287
84	0.3	0.21	2e + 05	1.05	0.00	1.00	0.00	0.16	145568	1038429
85	0.3	0.14	3e + 05	1.05	0.00	1.00	0.00	0.13	256517	903934
86	0.3	0.16	3e + 05	1.05	0.00	1.00	0.00	0.14	241526	955723
87	0.3	0.21	3e + 05	1.05	0.00	1.00	0.00	0.14	198002	1080090
88	0.3	0.14	4e + 05	1.05	0.00	1.00	0.00	0.10	282410	952591
89	0.3	0.16	4e + 05	1.05	0.00	1.00	0.00	0.11	270932	950907
90	0.3	0.21	4e + 05	1.05	0.00	1.00	0.00	0.13	244184	1031496
91	0.1	0.14	0e + 00	1.10	1.00	0.00	0.00	0.16	214019	909453
92	0.1	0.16	0e + 00	1.10	1.00	0.00	0.00	0.18	175236	999468
93	0.1	0.21	0e + 00	1.10	1.00	0.00	0.44	0.23	99483	1011282
94	0.1	0.14	1e + 05	1.10	1.00	0.00	0.00	0.16	214226	943962
95	0.1	0.16	1e + 05	1.10	1.00	0.00	0.00	0.18	174621	953693
96	0.1	0.21	1e + 05	1.10	0.92	0.53	0.47	0.23	99274	1013190
97	0.1	0.14	2e + 05	1.10	1.00	0.14	0.00	0.16	213807	913676
98	0.1	0.16	2e + 05	1.10	0.49	0.98	0.00	0.16	180169	926459
99	0.1	0.21	2e + 05	1.10	0.00	1.00	0.00	0.16	138189	937124
100	0.1	0.14	3e + 05	1.10	0.00	1.00	0.00	0.13	251978	929390
101	0.1	0.16	3e + 05	1.10	0.00	1.00	0.00	0.14	233281	944135
102	0.1	0.21	3e + 05	1.10	0.00	1.00	0.00	0.15	189914	968353
103	0.1	0.14	4e + 05	1.10	0.00	1.00	0.00	0.11	277896	834871
104	0.1	0.16	4e + 05	1.10	0.00	1.00	0.00	0.12	266418	900332
105	0.1	0.21	4e + 05	1.10	0.00	1.00	0.00	0.14	236346	945665
106	0.2	0.14	0e + 00	1.10	1.00	0.00	0.00	0.16	214180	948168
107	0.2	0.16	0e + 00	1.10	1.00	0.00	0.00	0.18	174978	978386
108	0.2	0.21	0e + 00	1.10	1.00	0.00	0.47	0.23	99815	1008669
109	0.2	0.14	1e + 05	1.10	1.00	0.00	0.00	0.16	215210	964604
110	0.2	0.16	1e + 05	1.10	1.00	0.00	0.00	0.18	175843	971050
111	0.2	0.21	1e + 05	1.10	0.84	0.50	0.47	0.23	99984	962744
112	0.2	0.14	2e + 05	1.10	1.00	0.15	0.00	0.16	213968	916038
113	0.2	0.16	2e + 05	1.10	0.51	0.95	0.00	0.16	180720	953212
114	0.2	0.21	2e + 05	1.10	0.00	1.00	0.00	0.16	137831	937543
115	0.2	0.14	3e + 05	1.10	0.01	1.00	0.00	0.13	251400	813756
116	0.2	0.16	3e + 05	1.10	0.00	1.00	0.00	0.14	233305	887325
117	0.2	0.21	3e + 05	1.10	0.00	1.00	0.00	0.15	189665	948757
118	0.2	0.14	4e + 05	1.10	0.00	1.00	0.00	0.11	277772	886715
119	0.2	0.16	4e + 05	1.10	0.00	1.00	0.00	0.12	266397	967007
120	0.2	0.21	4e + 05	1.10	0.00	1.00	0.00	0.14	236587	955765

Table 3: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
121	0.3	0.14	0e + 00	1.10	1.00	0.00	0.00	0.16	215217	917460
122	0.3	0.16	0e + 00	1.10	1.00	0.00	0.00	0.18	174464	1006049
123	0.3	0.21	0e + 00	1.10	1.00	0.00	0.48	0.23	100985	995292
124	0.3	0.14	1e + 05	1.10	1.00	0.00	0.00	0.16	213912	1031596
125	0.3	0.16	1e + 05	1.10	1.00	0.00	0.00	0.18	175459	946005
126	0.3	0.21	1e + 05	1.10	0.80	0.47	0.46	0.23	101044	1005521
127	0.3	0.14	2e + 05	1.10	0.99	0.20	0.00	0.16	215070	1102935
128	0.3	0.16	2e + 05	1.10	0.48	0.90	0.00	0.16	179861	1029674
129	0.3	0.21	2e + 05	1.10	0.00	1.00	0.02	0.16	138303	891320
130	0.3	0.14	3e + 05	1.10	0.01	1.00	0.00	0.13	251622	810691
131	0.3	0.16	3e + 05	1.10	0.00	1.00	0.00	0.14	232596	1046165
132	0.3	0.21	3e + 05	1.10	0.00	1.00	0.00	0.15	189867	937590
133	0.3	0.14	4e + 05	1.10	0.00	1.00	0.00	0.11	277940	874418
134	0.3	0.16	4e + 05	1.10	0.00	1.00	0.00	0.12	266516	917638
135	0.3	0.21	4e + 05	1.10	0.00	1.00	0.00	0.14	236169	869971
136	0.1	0.14	0e + 00	1.20	1.00	0.00	0.00	0.17	186690	970043
137	0.1	0.16	0e + 00	1.20	1.00	0.00	0.00	0.20	146541	983108
138	0.1	0.21	0e + 00	1.20	1.00	0.00	0.99	0.26	77497	1031423
139	0.1	0.14	1e + 05	1.20	1.00	0.00	0.00	0.17	186505	933456
140	0.1	0.16	1e + 05	1.20	1.00	0.00	0.00	0.20	147030	1010503
141	0.1	0.21	1e + 05	1.20	0.48	1.00	1.00	0.21	81548	973230
142	0.1	0.14	2e + 05	1.20	1.00	0.84	0.00	0.16	188287	931560
143	0.1	0.16	2e + 05	1.20	0.45	1.00	0.00	0.16	163477	948583
144	0.1	0.21	2e + 05	1.20	0.00	1.00	0.00	0.16	126377	991284
145	0.1	0.14	3e + 05	1.20	0.19	1.00	0.00	0.14	239328	898165
146	0.1	0.16	3e + 05	1.20	0.00	1.00	0.00	0.14	217676	944039
147	0.1	0.21	3e + 05	1.20	0.00	1.00	0.00	0.15	175148	975027
148	0.1	0.14	4e + 05	1.20	0.00	1.00	0.00	0.11	270243	863712
149	0.1	0.16	4e + 05	1.20	0.00	1.00	0.00	0.12	258070	939251
150	0.1	0.21	4e + 05	1.20	0.00	1.00	0.00	0.14	220770	947740
151	0.2	0.14	0e + 00	1.20	1.00	0.00	0.00	0.17	186100	939927
152	0.2	0.16	0e + 00	1.20	1.00	0.00	0.00	0.20	146750	976367
153	0.2	0.21	0e + 00	1.20	1.00	0.00	0.96	0.26	77503	999208
154	0.2	0.14	1e + 05	1.20	1.00	0.00	0.00	0.17	187128	968011
155	0.2	0.16	1e + 05	1.20	1.00	0.00	0.00	0.20	147091	986638
156	0.2	0.21	1e + 05	1.20	0.47	0.99	0.94	0.21	81444	975775
157	0.2	0.14	2e + 05	1.20	1.00	0.80	0.00	0.16	188513	911372
158	0.2	0.16	2e + 05	1.20	0.46	1.00	0.00	0.16	163644	987318
159	0.2	0.21	2e + 05	1.20	0.00	1.00	0.01	0.16	126494	994984
160	0.2	0.14	3e + 05	1.20	0.22	1.00	0.00	0.14	238923	905437

Table 3: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
161	0.2	0.16	$3e + 05$	1.20	0.00	1.00	0.00	0.14	217957	913838
162	0.2	0.21	$3e + 05$	1.20	0.00	1.00	0.00	0.15	174815	967292
163	0.2	0.14	$4e + 05$	1.20	0.00	1.00	0.00	0.11	269719	849883
164	0.2	0.16	$4e + 05$	1.20	0.00	1.00	0.00	0.12	258223	933240
165	0.2	0.21	$4e + 05$	1.20	0.00	1.00	0.00	0.14	220651	946919
166	0.3	0.14	$0e + 00$	1.20	1.00	0.00	0.00	0.17	186416	911835
167	0.3	0.16	$0e + 00$	1.20	1.00	0.00	0.02	0.20	146125	945901
168	0.3	0.21	$0e + 00$	1.20	1.00	0.00	0.88	0.26	77318	953438
169	0.3	0.14	$1e + 05$	1.20	1.00	0.00	0.00	0.17	186586	889765
170	0.3	0.16	$1e + 05$	1.20	1.00	0.00	0.02	0.20	147540	948640
171	0.3	0.21	$1e + 05$	1.20	0.50	0.96	0.88	0.21	81774	982332
172	0.3	0.14	$2e + 05$	1.20	0.98	0.75	0.00	0.16	189322	1146068
173	0.3	0.16	$2e + 05$	1.20	0.46	1.00	0.00	0.16	163139	933293
174	0.3	0.21	$2e + 05$	1.20	0.00	1.00	0.05	0.16	126157	962107
175	0.3	0.14	$3e + 05$	1.20	0.25	1.00	0.00	0.14	239861	923931
176	0.3	0.16	$3e + 05$	1.20	0.00	1.00	0.00	0.14	217231	969240
177	0.3	0.21	$3e + 05$	1.20	0.00	1.00	0.00	0.15	175626	934660
178	0.3	0.14	$4e + 05$	1.20	0.00	1.00	0.00	0.11	269897	978574
179	0.3	0.16	$4e + 05$	1.20	0.00	1.00	0.00	0.12	257880	843508
180	0.3	0.21	$4e + 05$	1.20	0.00	1.00	0.00	0.14	220705	914126



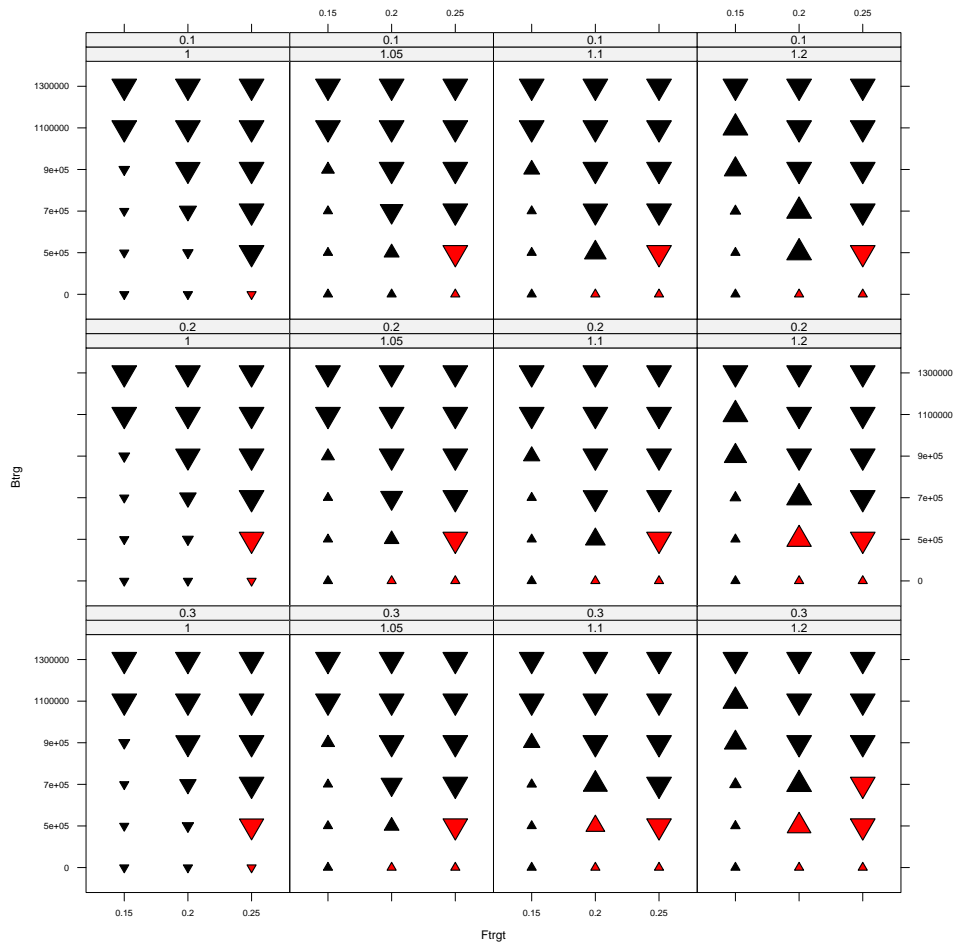


Figure 12: Central Baltic Herring risk analysis

Table 4: Central Baltic herring - metrics measured in 2029

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
1	0.1	0.15	0	1.00	0.32	0.00	0.00	0.15	895820	2106903
2	0.1	0.20	0	1.00	0.25	0.00	0.00	0.20	549781	2116454
3	0.1	0.25	0	1.00	0.24	0.00	0.81	0.25	328010	1896378
4	0.1	0.15	500000	1.00	0.31	0.00	0.00	0.15	897808	1909502
5	0.1	0.20	500000	1.00	0.23	0.13	0.00	0.20	549690	1984122
6	0.1	0.25	500000	1.00	0.00	1.00	0.01	0.21	427264	1851738
7	0.1	0.15	700000	1.00	0.30	0.00	0.00	0.15	920986	2135111
8	0.1	0.20	700000	1.00	0.10	0.63	0.00	0.20	687644	1969661
9	0.1	0.25	700000	1.00	0.00	1.00	0.00	0.20	574033	1948817
10	0.1	0.15	900000	1.00	0.26	0.14	0.00	0.15	936253	2123352
11	0.1	0.20	900000	1.00	0.00	0.99	0.00	0.18	835191	2009346
12	0.1	0.25	900000	1.00	0.00	1.00	0.00	0.19	714346	2101651
13	0.1	0.15	1100000	1.00	0.00	1.00	0.00	0.13	987413	1983453
14	0.1	0.20	1100000	1.00	0.00	1.00	0.00	0.16	903380	2109482
15	0.1	0.25	1100000	1.00	0.00	1.00	0.00	0.19	832593	2174064
16	0.1	0.15	1300000	1.00	0.00	1.00	0.00	0.12	1038124	1869491
17	0.1	0.20	1300000	1.00	0.00	1.00	0.00	0.14	954240	2092766
18	0.1	0.25	1300000	1.00	0.00	1.00	0.00	0.17	890991	2038860
19	0.2	0.15	0	1.00	0.31	0.00	0.00	0.15	894147	1815809
20	0.2	0.20	0	1.00	0.25	0.00	0.01	0.20	550002	2327517
21	0.2	0.25	0	1.00	0.25	0.00	0.72	0.25	328795	1975427
22	0.2	0.15	500000	1.00	0.32	0.00	0.00	0.15	896063	1917948
23	0.2	0.20	500000	1.00	0.22	0.16	0.00	0.20	558137	2340197
24	0.2	0.25	500000	1.00	0.00	1.00	0.10	0.21	428320	1807002
25	0.2	0.15	700000	1.00	0.31	0.00	0.00	0.15	919135	2096307
26	0.2	0.20	700000	1.00	0.11	0.60	0.00	0.20	689043	2422630
27	0.2	0.25	700000	1.00	0.00	1.00	0.00	0.20	575087	2003252
28	0.2	0.15	900000	1.00	0.28	0.17	0.00	0.15	934848	1875656
29	0.2	0.20	900000	1.00	0.00	0.99	0.00	0.18	835080	2077597
30	0.2	0.25	900000	1.00	0.00	1.00	0.00	0.19	713566	2179260
31	0.2	0.15	1100000	1.00	0.00	1.00	0.00	0.13	986599	1799199
32	0.2	0.20	1100000	1.00	0.00	1.00	0.00	0.16	903282	2171162
33	0.2	0.25	1100000	1.00	0.00	1.00	0.00	0.18	831253	2110614
34	0.2	0.15	1300000	1.00	0.00	1.00	0.00	0.12	1038300	1796157
35	0.2	0.20	1300000	1.00	0.00	1.00	0.00	0.14	954683	2231403
36	0.2	0.25	1300000	1.00	0.00	1.00	0.00	0.17	889417	2294886
37	0.3	0.15	0	1.00	0.30	0.00	0.00	0.15	896322	2141715
38	0.3	0.20	0	1.00	0.27	0.00	0.04	0.20	559190	2021842
39	0.3	0.25	0	1.00	0.26	0.00	0.65	0.25	335853	2377607
40	0.3	0.15	500000	1.00	0.33	0.00	0.00	0.15	896720	2153535

Table 4: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
41	0.3	0.20	500000	1.00	0.22	0.21	0.02	0.20	557676	2211901
42	0.3	0.25	500000	1.00	0.00	0.98	0.20	0.21	429375	2012128
43	0.3	0.15	700000	1.00	0.32	0.00	0.00	0.15	915610	1696179
44	0.3	0.20	700000	1.00	0.11	0.59	0.00	0.20	689135	2460061
45	0.3	0.25	700000	1.00	0.00	1.00	0.00	0.20	571774	1908158
46	0.3	0.15	900000	1.00	0.25	0.19	0.00	0.15	935577	2235448
47	0.3	0.20	900000	1.00	0.01	0.98	0.00	0.18	832847	1890385
48	0.3	0.25	900000	1.00	0.00	1.00	0.00	0.19	712980	1775555
49	0.3	0.15	1100000	1.00	0.00	1.00	0.00	0.13	985047	1531643
50	0.3	0.20	1100000	1.00	0.00	1.00	0.00	0.16	901215	1928169
51	0.3	0.25	1100000	1.00	0.00	1.00	0.00	0.18	828563	1635908
52	0.3	0.15	1300000	1.00	0.00	1.00	0.00	0.12	1037378	1670571
53	0.3	0.20	1300000	1.00	0.00	1.00	0.00	0.14	954400	2132486
54	0.3	0.25	1300000	1.00	0.00	1.00	0.00	0.17	890040	2340685
55	0.1	0.15	0	1.05	1.00	0.00	0.00	0.16	841283	1952242
56	0.1	0.20	0	1.05	1.00	0.00	0.01	0.21	489166	1793078
57	0.1	0.25	0	1.05	1.00	0.00	0.97	0.26	287202	1833009
58	0.1	0.15	500000	1.05	1.00	0.00	0.00	0.16	846092	1908497
59	0.1	0.20	500000	1.05	0.84	0.49	0.00	0.21	500677	1898785
60	0.1	0.25	500000	1.05	0.00	1.00	0.08	0.21	406766	1983374
61	0.1	0.15	700000	1.05	1.00	0.00	0.00	0.16	888563	1923570
62	0.1	0.20	700000	1.05	0.43	0.91	0.00	0.20	657764	2149564
63	0.1	0.25	700000	1.05	0.00	1.00	0.00	0.20	549382	2016792
64	0.1	0.15	900000	1.05	0.98	0.33	0.00	0.16	913851	2214088
65	0.1	0.20	900000	1.05	0.07	1.00	0.00	0.19	809253	2254927
66	0.1	0.25	900000	1.05	0.00	1.00	0.00	0.20	682786	1965788
67	0.1	0.15	1100000	1.05	0.00	1.00	0.00	0.14	970923	2072822
68	0.1	0.20	1100000	1.05	0.00	1.00	0.00	0.17	887183	2052445
69	0.1	0.25	1100000	1.05	0.00	1.00	0.00	0.19	805887	1988397
70	0.1	0.15	1300000	1.05	0.00	1.00	0.00	0.12	1022286	1865362
71	0.1	0.20	1300000	1.05	0.00	1.00	0.00	0.15	939167	1993044
72	0.1	0.25	1300000	1.05	0.00	1.00	0.00	0.17	874333	2182879
73	0.2	0.15	0	1.05	1.00	0.00	0.00	0.16	848018	2289952
74	0.2	0.20	0	1.05	1.00	0.00	0.06	0.21	489494	1826267
75	0.2	0.25	0	1.05	1.00	0.00	0.89	0.26	286981	1668922
76	0.2	0.15	500000	1.05	1.00	0.00	0.00	0.16	849286	2347162
77	0.2	0.20	500000	1.05	0.79	0.47	0.00	0.21	503126	1966790
78	0.2	0.25	500000	1.05	0.00	1.00	0.20	0.21	406223	1716309
79	0.2	0.15	700000	1.05	1.00	0.00	0.00	0.16	888556	1907602
80	0.2	0.20	700000	1.05	0.40	0.88	0.00	0.20	656224	2178457

Table 4: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
81	0.2	0.25	700000	1.05	0.00	1.00	0.00	0.20	548024	1934895
82	0.2	0.15	900000	1.05	0.97	0.34	0.00	0.16	915078	1937228
83	0.2	0.20	900000	1.05	0.09	1.00	0.00	0.19	807081	2327468
84	0.2	0.25	900000	1.05	0.00	1.00	0.00	0.20	682455	1996778
85	0.2	0.15	1100000	1.05	0.01	1.00	0.00	0.14	971400	2140986
86	0.2	0.20	1100000	1.05	0.00	1.00	0.00	0.17	886251	2010266
87	0.2	0.25	1100000	1.05	0.00	1.00	0.00	0.19	804994	2383767
88	0.2	0.15	1300000	1.05	0.00	1.00	0.00	0.12	1022144	1858393
89	0.2	0.20	1300000	1.05	0.00	1.00	0.00	0.15	938628	2177696
90	0.2	0.25	1300000	1.05	0.00	1.00	0.00	0.17	872906	2142740
91	0.3	0.15	0	1.05	1.00	0.00	0.00	0.16	847146	2164399
92	0.3	0.20	0	1.05	1.00	0.00	0.14	0.21	491631	1553881
93	0.3	0.25	0	1.05	1.00	0.00	0.81	0.26	288864	1942867
94	0.3	0.15	500000	1.05	1.00	0.00	0.00	0.16	844431	2028011
95	0.3	0.20	500000	1.05	0.75	0.48	0.03	0.21	502984	2175974
96	0.3	0.25	500000	1.05	0.02	0.99	0.29	0.21	407404	1891388
97	0.3	0.15	700000	1.05	1.00	0.00	0.00	0.16	885579	2105315
98	0.3	0.20	700000	1.05	0.45	0.84	0.00	0.20	658397	1998662
99	0.3	0.25	700000	1.05	0.00	1.00	0.01	0.20	547796	2093785
100	0.3	0.15	900000	1.05	0.96	0.36	0.00	0.16	913761	1906469
101	0.3	0.20	900000	1.05	0.11	0.99	0.00	0.19	807458	2209859
102	0.3	0.25	900000	1.05	0.00	1.00	0.00	0.20	681234	2147499
103	0.3	0.15	1100000	1.05	0.01	1.00	0.00	0.14	970230	1892906
104	0.3	0.20	1100000	1.05	0.00	1.00	0.00	0.17	884335	2261815
105	0.3	0.25	1100000	1.05	0.00	1.00	0.00	0.19	804044	1928947
106	0.3	0.15	1300000	1.05	0.00	1.00	0.00	0.12	1021800	2033744
107	0.3	0.20	1300000	1.05	0.00	1.00	0.00	0.15	938899	1806486
108	0.3	0.25	1300000	1.05	0.00	1.00	0.00	0.17	872125	2348442
109	0.1	0.15	0	1.10	1.00	0.00	0.00	0.17	779120	2000409
110	0.1	0.20	0	1.10	1.00	0.00	0.07	0.22	437526	1844068
111	0.1	0.25	0	1.10	1.00	0.00	1.00	0.28	251021	1865270
112	0.1	0.15	500000	1.10	1.00	0.00	0.00	0.17	782185	2168760
113	0.1	0.20	500000	1.10	0.83	0.86	0.00	0.21	470199	1804038
114	0.1	0.25	500000	1.10	0.00	1.00	0.21	0.21	387736	1948160
115	0.1	0.15	700000	1.10	1.00	0.00	0.00	0.17	852882	1938144
116	0.1	0.20	700000	1.10	0.48	0.99	0.00	0.20	629368	2031941
117	0.1	0.25	700000	1.10	0.00	1.00	0.00	0.21	525394	2060407
118	0.1	0.15	900000	1.10	1.00	0.55	0.00	0.17	896174	2106587
119	0.1	0.20	900000	1.10	0.18	1.00	0.00	0.19	778432	2093602
120	0.1	0.25	900000	1.10	0.00	1.00	0.00	0.20	653527	2051455

Table 4: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
121	0.1	0.15	1100000	1.10	0.09	1.00	0.00	0.14	954907	2005939
122	0.1	0.20	1100000	1.10	0.00	1.00	0.00	0.17	870420	2087261
123	0.1	0.25	1100000	1.10	0.00	1.00	0.00	0.19	774356	2120715
124	0.1	0.15	1300000	1.10	0.00	1.00	0.00	0.13	1006536	1951215
125	0.1	0.20	1300000	1.10	0.00	1.00	0.00	0.16	923281	1989570
126	0.1	0.25	1300000	1.10	0.00	1.00	0.00	0.18	857445	2229618
127	0.2	0.15	0	1.10	1.00	0.00	0.00	0.17	786637	1997302
128	0.2	0.20	0	1.10	1.00	0.00	0.16	0.22	439334	1806213
129	0.2	0.25	0	1.10	1.00	0.00	0.98	0.28	247801	1735183
130	0.2	0.15	500000	1.10	1.00	0.00	0.00	0.17	781629	2200742
131	0.2	0.20	500000	1.10	0.82	0.77	0.02	0.21	472761	2004892
132	0.2	0.25	500000	1.10	0.00	1.00	0.33	0.21	388000	1719633
133	0.2	0.15	700000	1.10	1.00	0.01	0.00	0.17	849082	2120202
134	0.2	0.20	700000	1.10	0.48	0.98	0.00	0.20	629049	1984488
135	0.2	0.25	700000	1.10	0.00	1.00	0.00	0.20	523468	2088842
136	0.2	0.15	900000	1.10	1.00	0.58	0.00	0.17	893780	2214306
137	0.2	0.20	900000	1.10	0.20	1.00	0.00	0.19	779043	2138652
138	0.2	0.25	900000	1.10	0.00	1.00	0.00	0.20	652848	1915486
139	0.2	0.15	1100000	1.10	0.12	1.00	0.00	0.14	955682	2083643
140	0.2	0.20	1100000	1.10	0.00	1.00	0.00	0.17	869839	2340781
141	0.2	0.25	1100000	1.10	0.00	1.00	0.00	0.19	772691	2028283
142	0.2	0.15	1300000	1.10	0.00	1.00	0.00	0.13	1006839	1820009
143	0.2	0.20	1300000	1.10	0.00	1.00	0.00	0.15	922787	1939695
144	0.2	0.25	1300000	1.10	0.00	1.00	0.00	0.18	856869	2254853
145	0.3	0.15	0	1.10	1.00	0.00	0.00	0.17	779329	1444066
146	0.3	0.20	0	1.10	1.00	0.00	0.24	0.22	440559	1405667
147	0.3	0.25	0	1.10	1.00	0.00	0.92	0.28	249723	2550807
148	0.3	0.15	500000	1.10	1.00	0.00	0.00	0.17	788209	1522934
149	0.3	0.20	500000	1.10	0.78	0.72	0.07	0.21	475028	1881159
150	0.3	0.25	500000	1.10	0.01	1.00	0.38	0.21	389238	1474772
151	0.3	0.15	700000	1.10	1.00	0.02	0.00	0.17	850164	2408616
152	0.3	0.20	700000	1.10	0.50	0.97	0.00	0.20	631026	1948419
153	0.3	0.25	700000	1.10	0.00	1.00	0.02	0.20	523803	1992647
154	0.3	0.15	900000	1.10	0.99	0.58	0.00	0.17	892887	2540845
155	0.3	0.20	900000	1.10	0.22	1.00	0.00	0.19	775070	1977394
156	0.3	0.25	900000	1.10	0.00	1.00	0.00	0.20	652751	1884643
157	0.3	0.15	1100000	1.10	0.12	1.00	0.00	0.14	957187	2360271
158	0.3	0.20	1100000	1.10	0.00	1.00	0.00	0.17	867615	2236980
159	0.3	0.25	1100000	1.10	0.00	1.00	0.00	0.19	774706	1889768
160	0.3	0.15	1300000	1.10	0.00	1.00	0.00	0.13	1007715	1849107

Table 4: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
161	0.3	0.20	1300000	1.10	0.00	1.00	0.00	0.15	922338	1994022
162	0.3	0.25	1300000	1.10	0.00	1.00	0.00	0.18	856548	2302064
163	0.1	0.15	0	1.20	1.00	0.00	0.00	0.18	657638	2252439
164	0.1	0.20	0	1.20	1.00	0.00	0.67	0.24	348996	2075557
165	0.1	0.25	0	1.20	1.00	0.00	1.00	0.31	186523	1789269
166	0.1	0.15	500000	1.20	1.00	0.00	0.00	0.18	656521	1871359
167	0.1	0.20	500000	1.20	0.86	1.00	0.01	0.21	430093	1931548
168	0.1	0.25	500000	1.20	0.00	1.00	0.67	0.21	355396	1842868
169	0.1	0.15	700000	1.20	1.00	0.13	0.00	0.18	754120	2199413
170	0.1	0.20	700000	1.20	0.59	1.00	0.00	0.20	580012	2015842
171	0.1	0.25	700000	1.20	0.00	1.00	0.00	0.21	482575	2024014
172	0.1	0.15	900000	1.20	1.00	0.89	0.00	0.18	863957	2023086
173	0.1	0.20	900000	1.20	0.29	1.00	0.00	0.19	720026	2165841
174	0.1	0.25	900000	1.20	0.00	1.00	0.00	0.20	602420	2086723
175	0.1	0.15	1100000	1.20	0.78	1.00	0.00	0.15	927291	2122035
176	0.1	0.20	1100000	1.20	0.01	1.00	0.00	0.18	837290	2003505
177	0.1	0.25	1100000	1.20	0.00	1.00	0.00	0.20	717307	2060145
178	0.1	0.15	1300000	1.20	0.00	1.00	0.00	0.14	979373	1994170
179	0.1	0.20	1300000	1.20	0.00	1.00	0.00	0.17	894868	2140488
180	0.1	0.25	1300000	1.20	0.00	1.00	0.00	0.19	818330	2124013
181	0.2	0.15	0	1.20	1.00	0.00	0.00	0.18	660015	1666584
182	0.2	0.20	0	1.20	1.00	0.00	0.61	0.24	351069	1788771
183	0.2	0.25	0	1.20	1.00	0.00	1.00	0.31	187364	1502131
184	0.2	0.15	500000	1.20	1.00	0.01	0.00	0.18	660223	1807929
185	0.2	0.20	500000	1.20	0.83	0.99	0.09	0.21	430392	1890719
186	0.2	0.25	500000	1.20	0.00	1.00	0.60	0.21	354953	1743625
187	0.2	0.15	700000	1.20	1.00	0.16	0.00	0.18	751819	2167001
188	0.2	0.20	700000	1.20	0.56	1.00	0.00	0.20	579109	1919635
189	0.2	0.25	700000	1.20	0.00	1.00	0.01	0.21	481959	2062454
190	0.2	0.15	900000	1.20	1.00	0.89	0.00	0.18	862146	2088836
191	0.2	0.20	900000	1.20	0.31	1.00	0.00	0.19	718500	1716750
192	0.2	0.25	900000	1.20	0.00	1.00	0.00	0.20	601714	2126721
193	0.2	0.15	1100000	1.20	0.76	1.00	0.00	0.15	925522	2230664
194	0.2	0.20	1100000	1.20	0.01	1.00	0.00	0.18	836923	1921556
195	0.2	0.25	1100000	1.20	0.00	1.00	0.00	0.19	715315	2265654
196	0.2	0.15	1300000	1.20	0.00	1.00	0.00	0.14	978659	1834136
197	0.2	0.20	1300000	1.20	0.00	1.00	0.00	0.17	894135	2117186
198	0.2	0.25	1300000	1.20	0.00	1.00	0.00	0.19	817196	2112069
199	0.3	0.15	0	1.20	1.00	0.00	0.01	0.18	655983	2036792
200	0.3	0.20	0	1.20	1.00	0.00	0.58	0.24	349475	2488345

Table 4: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
201	0.3	0.25	0	1.20	1.00	0.00	0.99	0.31	192732	1784336
202	0.3	0.15	500000	1.20	1.00	0.03	0.00	0.18	664865	1973651
203	0.3	0.20	500000	1.20	0.80	0.96	0.20	0.21	432278	2311224
204	0.3	0.25	500000	1.20	0.01	1.00	0.62	0.21	355324	1915760
205	0.3	0.15	700000	1.20	1.00	0.22	0.00	0.18	755648	2190501
206	0.3	0.20	700000	1.20	0.58	1.00	0.00	0.20	580393	2053851
207	0.3	0.25	700000	1.20	0.00	1.00	0.06	0.21	483386	1853145
208	0.3	0.15	900000	1.20	1.00	0.88	0.00	0.18	862523	2146553
209	0.3	0.20	900000	1.20	0.33	1.00	0.00	0.19	717603	2268583
210	0.3	0.25	900000	1.20	0.00	1.00	0.00	0.20	601548	1709011
211	0.3	0.15	1100000	1.20	0.75	1.00	0.00	0.15	926315	2234675
212	0.3	0.20	1100000	1.20	0.02	1.00	0.00	0.18	833410	2592352
213	0.3	0.25	1100000	1.20	0.00	1.00	0.00	0.19	716303	2549955
214	0.3	0.15	1300000	1.20	0.00	1.00	0.00	0.14	978821	1950242
215	0.3	0.20	1300000	1.20	0.00	1.00	0.00	0.17	892137	2019392
216	0.3	0.25	1300000	1.20	0.00	1.00	0.00	0.19	815021	2143602

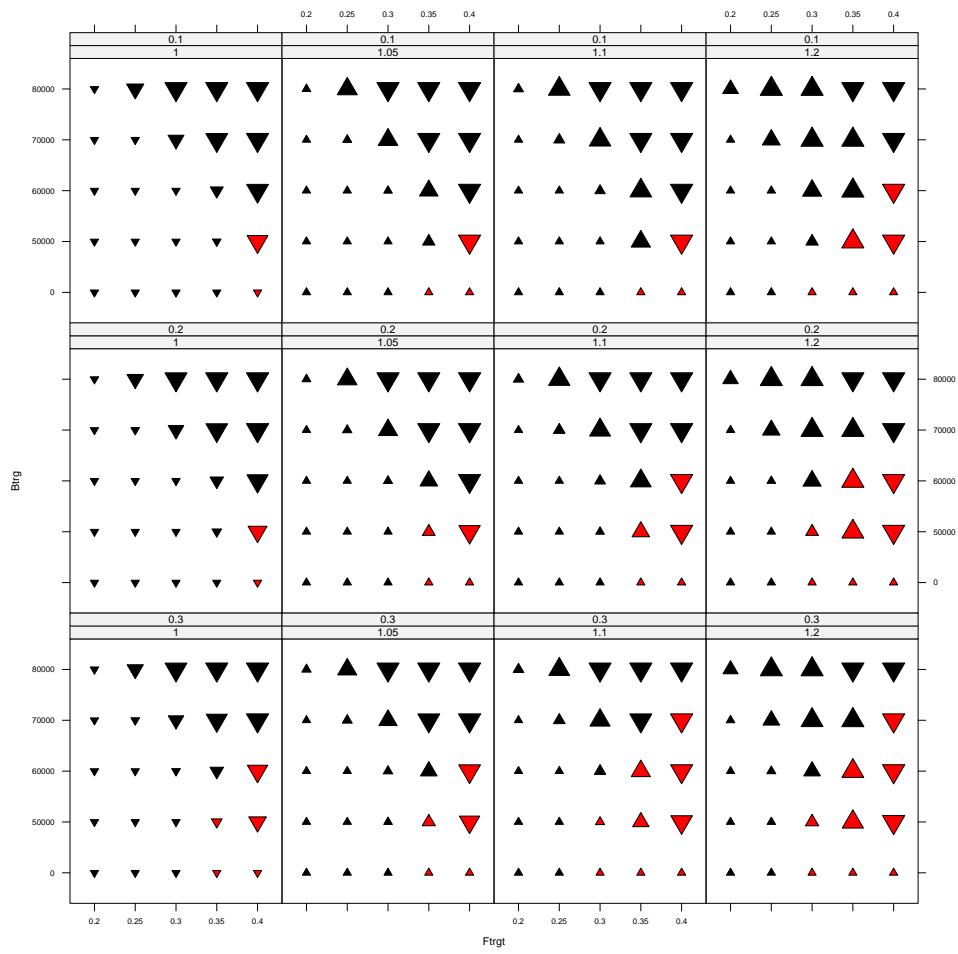


Figure 13: Gulf of Riga herring risk analysis



Table 5: Golf of Riga herring - metrics measured in 2029

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
1	0.1	0.20	0	1.00	0.22	0.00	0.00	0.20	88315	337508
2	0.1	0.25	0	1.00	0.26	0.00	0.00	0.25	76824	370625
3	0.1	0.30	0	1.00	0.12	0.00	0.00	0.30	67646	393696
4	0.1	0.35	0	1.00	0.23	0.00	0.00	0.35	58664	405463
5	0.1	0.40	0	1.00	0.24	0.00	0.60	0.40	38958	379695
6	0.1	0.20	50000	1.00	0.24	0.00	0.00	0.20	88312	347898
7	0.1	0.25	50000	1.00	0.26	0.00	0.00	0.25	76860	375442
8	0.1	0.30	50000	1.00	0.14	0.00	0.00	0.30	67767	390678
9	0.1	0.35	50000	1.00	0.23	0.05	0.00	0.35	58528	401387
10	0.1	0.40	50000	1.00	0.02	0.94	0.06	0.36	45290	390659
11	0.1	0.20	60000	1.00	0.23	0.00	0.00	0.20	88381	341336
12	0.1	0.25	60000	1.00	0.28	0.00	0.00	0.25	76808	375254
13	0.1	0.30	60000	1.00	0.14	0.01	0.00	0.30	67771	402383
14	0.1	0.35	60000	1.00	0.12	0.46	0.00	0.35	60271	394820
15	0.1	0.40	60000	1.00	0.00	0.98	0.00	0.35	53573	386667
16	0.1	0.20	70000	1.00	0.24	0.00	0.00	0.20	88477	345962
17	0.1	0.25	70000	1.00	0.23	0.02	0.00	0.25	76847	370761
18	0.1	0.30	70000	1.00	0.05	0.67	0.00	0.29	68834	382760
19	0.1	0.35	70000	1.00	0.00	0.99	0.00	0.32	64514	389709
20	0.1	0.40	70000	1.00	0.00	1.00	0.00	0.34	60641	409139
21	0.1	0.20	80000	1.00	0.20	0.01	0.00	0.20	88365	339267
22	0.1	0.25	80000	1.00	0.06	0.75	0.00	0.24	78263	369056
23	0.1	0.30	80000	1.00	0.00	1.00	0.00	0.27	72654	386679
24	0.1	0.35	80000	1.00	0.00	1.00	0.00	0.30	68343	394911
25	0.1	0.40	80000	1.00	0.00	1.00	0.00	0.32	64770	401155
26	0.2	0.20	0	1.00	0.22	0.00	0.00	0.20	88452	344759
27	0.2	0.25	0	1.00	0.24	0.00	0.00	0.25	76742	391530
28	0.2	0.30	0	1.00	0.14	0.00	0.00	0.30	67603	379590
29	0.2	0.35	0	1.00	0.22	0.00	0.03	0.35	58772	402496
30	0.2	0.40	0	1.00	0.28	0.00	0.57	0.40	39039	384271
31	0.2	0.20	50000	1.00	0.25	0.00	0.00	0.20	88345	341612
32	0.2	0.25	50000	1.00	0.23	0.00	0.00	0.25	76465	357580
33	0.2	0.30	50000	1.00	0.13	0.00	0.00	0.30	67731	397702
34	0.2	0.35	50000	1.00	0.18	0.16	0.02	0.35	58462	398981
35	0.2	0.40	50000	1.00	0.04	0.85	0.18	0.36	45342	370816
36	0.2	0.20	60000	1.00	0.24	0.00	0.00	0.20	88488	339471
37	0.2	0.25	60000	1.00	0.23	0.00	0.00	0.25	76416	375754
38	0.2	0.30	60000	1.00	0.16	0.02	0.00	0.30	67683	394007
39	0.2	0.35	60000	1.00	0.11	0.50	0.00	0.35	59923	401233
40	0.2	0.40	60000	1.00	0.02	0.96	0.02	0.35	53641	376665

Table 5: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
41	0.2	0.20	70000	1.00	0.24	0.00	0.00	0.20	88207	334805
42	0.2	0.25	70000	1.00	0.23	0.04	0.00	0.25	76716	368964
43	0.2	0.30	70000	1.00	0.05	0.65	0.00	0.29	68813	398230
44	0.2	0.35	70000	1.00	0.01	0.98	0.00	0.32	64387	417872
45	0.2	0.40	70000	1.00	0.00	1.00	0.00	0.34	60790	432665
46	0.2	0.20	80000	1.00	0.24	0.02	0.00	0.20	88337	362172
47	0.2	0.25	80000	1.00	0.06	0.70	0.00	0.24	78256	369564
48	0.2	0.30	80000	1.00	0.00	0.99	0.00	0.27	72735	377682
49	0.2	0.35	80000	1.00	0.00	1.00	0.00	0.30	68249	382392
50	0.2	0.40	80000	1.00	0.00	1.00	0.00	0.32	64724	402006
51	0.3	0.20	0	1.00	0.23	0.00	0.00	0.20	88436	336191
52	0.3	0.25	0	1.00	0.24	0.00	0.00	0.25	76742	387027
53	0.3	0.30	0	1.00	0.16	0.00	0.01	0.30	67974	403167
54	0.3	0.35	0	1.00	0.22	0.00	0.13	0.35	58106	378154
55	0.3	0.40	0	1.00	0.28	0.00	0.55	0.40	39519	388474
56	0.3	0.20	50000	1.00	0.24	0.00	0.00	0.20	88418	332847
57	0.3	0.25	50000	1.00	0.25	0.00	0.00	0.25	76695	383054
58	0.3	0.30	50000	1.00	0.15	0.01	0.01	0.30	68018	379683
59	0.3	0.35	50000	1.00	0.18	0.27	0.08	0.35	57557	405438
60	0.3	0.40	50000	1.00	0.06	0.77	0.28	0.36	45483	418177
61	0.3	0.20	60000	1.00	0.25	0.00	0.00	0.20	87959	367537
62	0.3	0.25	60000	1.00	0.22	0.00	0.00	0.25	76734	365410
63	0.3	0.30	60000	1.00	0.14	0.06	0.00	0.30	67683	397996
64	0.3	0.35	60000	1.00	0.10	0.51	0.02	0.35	59916	393522
65	0.3	0.40	60000	1.00	0.02	0.91	0.08	0.35	53548	375484
66	0.3	0.20	70000	1.00	0.24	0.00	0.00	0.20	88324	320072
67	0.3	0.25	70000	1.00	0.21	0.06	0.00	0.25	76613	398241
68	0.3	0.30	70000	1.00	0.06	0.64	0.00	0.29	68871	412825
69	0.3	0.35	70000	1.00	0.01	0.95	0.00	0.32	64570	402259
70	0.3	0.40	70000	1.00	0.00	1.00	0.02	0.34	60629	407676
71	0.3	0.20	80000	1.00	0.23	0.04	0.00	0.20	88444	337194
72	0.3	0.25	80000	1.00	0.08	0.68	0.00	0.24	78242	387083
73	0.3	0.30	80000	1.00	0.00	0.99	0.00	0.27	72602	376997
74	0.3	0.35	80000	1.00	0.00	1.00	0.00	0.30	68326	400652
75	0.3	0.40	80000	1.00	0.00	1.00	0.00	0.32	64493	385823
76	0.1	0.20	0	1.05	1.00	0.00	0.00	0.21	85508	353459
77	0.1	0.25	0	1.05	1.00	0.00	0.00	0.26	74127	378776
78	0.1	0.30	0	1.05	1.00	0.00	0.00	0.32	65034	400673
79	0.1	0.35	0	1.05	1.00	0.00	0.07	0.37	50911	399195
80	0.1	0.40	0	1.05	1.00	0.00	0.93	0.42	31029	351708

Table 5: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
81	0.1	0.20	50000	1.05	1.00	0.00	0.00	0.21	85559	343735
82	0.1	0.25	50000	1.05	1.00	0.00	0.00	0.26	74108	389965
83	0.1	0.30	50000	1.05	1.00	0.00	0.00	0.32	65012	404940
84	0.1	0.35	50000	1.05	0.81	0.41	0.00	0.37	51163	367757
85	0.1	0.40	50000	1.05	0.03	1.00	0.22	0.36	42777	374626
86	0.1	0.20	60000	1.05	1.00	0.00	0.00	0.21	85663	349859
87	0.1	0.25	60000	1.05	1.00	0.00	0.00	0.26	74147	378325
88	0.1	0.30	60000	1.05	1.00	0.05	0.00	0.32	65131	395948
89	0.1	0.35	60000	1.05	0.57	0.82	0.00	0.35	57155	386211
90	0.1	0.40	60000	1.05	0.01	1.00	0.00	0.35	50568	379451
91	0.1	0.20	70000	1.05	1.00	0.00	0.00	0.21	85647	358274
92	0.1	0.25	70000	1.05	1.00	0.10	0.00	0.26	74229	377517
93	0.1	0.30	70000	1.05	0.64	0.88	0.00	0.30	67161	392919
94	0.1	0.35	70000	1.05	0.08	1.00	0.00	0.33	62781	405807
95	0.1	0.40	70000	1.05	0.00	1.00	0.00	0.35	58440	390873
96	0.1	0.20	80000	1.05	1.00	0.05	0.00	0.21	85584	354198
97	0.1	0.25	80000	1.05	0.59	0.90	0.00	0.25	76509	380241
98	0.1	0.30	80000	1.05	0.03	1.00	0.00	0.28	70976	382868
99	0.1	0.35	80000	1.05	0.00	1.00	0.00	0.31	66774	393445
100	0.1	0.40	80000	1.05	0.00	1.00	0.00	0.33	63075	402178
101	0.2	0.20	0	1.05	1.00	0.00	0.00	0.21	85524	349546
102	0.2	0.25	0	1.05	1.00	0.00	0.00	0.26	74141	377832
103	0.2	0.30	0	1.05	1.00	0.00	0.00	0.32	65001	409804
104	0.2	0.35	0	1.05	1.00	0.00	0.20	0.37	50489	373411
105	0.2	0.40	0	1.05	1.00	0.00	0.81	0.42	31247	374230
106	0.2	0.20	50000	1.05	1.00	0.00	0.00	0.21	85539	348692
107	0.2	0.25	50000	1.05	1.00	0.00	0.00	0.26	74008	371662
108	0.2	0.30	50000	1.05	1.00	0.01	0.00	0.32	64927	409257
109	0.2	0.35	50000	1.05	0.72	0.45	0.07	0.37	51392	356244
110	0.2	0.40	50000	1.05	0.08	0.96	0.34	0.36	42666	340222
111	0.2	0.20	60000	1.05	1.00	0.00	0.00	0.21	85532	354178
112	0.2	0.25	60000	1.05	1.00	0.00	0.00	0.26	74267	383753
113	0.2	0.30	60000	1.05	0.99	0.10	0.00	0.32	65087	385315
114	0.2	0.35	60000	1.05	0.54	0.77	0.00	0.35	57113	354981
115	0.2	0.40	60000	1.05	0.06	0.99	0.04	0.36	50994	388311
116	0.2	0.20	70000	1.05	1.00	0.00	0.00	0.21	85597	357156
117	0.2	0.25	70000	1.05	0.99	0.14	0.00	0.26	73930	375504
118	0.2	0.30	70000	1.05	0.60	0.85	0.00	0.30	66987	408677
119	0.2	0.35	70000	1.05	0.10	1.00	0.00	0.33	62762	392856
120	0.2	0.40	70000	1.05	0.01	1.00	0.00	0.35	58563	371761

Table 5: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
121	0.2	0.20	80000	1.05	0.99	0.08	0.00	0.21	85713	349842
122	0.2	0.25	80000	1.05	0.58	0.87	0.00	0.25	76360	357131
123	0.2	0.30	80000	1.05	0.05	1.00	0.00	0.28	70959	388855
124	0.2	0.35	80000	1.05	0.00	1.00	0.00	0.31	66750	405770
125	0.2	0.40	80000	1.05	0.00	1.00	0.00	0.33	63103	411054
126	0.3	0.20	0	1.05	1.00	0.00	0.00	0.21	85835	335069
127	0.3	0.25	0	1.05	1.00	0.00	0.00	0.26	73727	387570
128	0.3	0.30	0	1.05	1.00	0.00	0.03	0.32	65171	399939
129	0.3	0.35	0	1.05	1.00	0.00	0.32	0.37	50769	410637
130	0.3	0.40	0	1.05	1.00	0.00	0.75	0.42	31049	340447
131	0.3	0.20	50000	1.05	1.00	0.00	0.00	0.21	85793	339091
132	0.3	0.25	50000	1.05	1.00	0.00	0.00	0.26	74179	379306
133	0.3	0.30	50000	1.05	0.98	0.05	0.02	0.32	64934	343507
134	0.3	0.35	50000	1.05	0.65	0.47	0.16	0.37	50927	360490
135	0.3	0.40	50000	1.05	0.16	0.91	0.38	0.36	42829	363944
136	0.3	0.20	60000	1.05	1.00	0.00	0.00	0.21	85293	337039
137	0.3	0.25	60000	1.05	1.00	0.00	0.00	0.26	73797	374619
138	0.3	0.30	60000	1.05	0.95	0.15	0.01	0.32	65244	392953
139	0.3	0.35	60000	1.05	0.56	0.71	0.04	0.35	57362	378413
140	0.3	0.40	60000	1.05	0.10	0.98	0.12	0.35	50673	372875
141	0.3	0.20	70000	1.05	1.00	0.00	0.00	0.21	85588	365511
142	0.3	0.25	70000	1.05	0.97	0.19	0.00	0.26	74040	403836
143	0.3	0.30	70000	1.05	0.60	0.81	0.00	0.30	66961	378059
144	0.3	0.35	70000	1.05	0.16	0.99	0.01	0.33	62930	374846
145	0.3	0.40	70000	1.05	0.02	1.00	0.03	0.35	58449	382493
146	0.3	0.20	80000	1.05	0.99	0.13	0.00	0.21	85560	373902
147	0.3	0.25	80000	1.05	0.57	0.85	0.00	0.25	76329	404272
148	0.3	0.30	80000	1.05	0.07	1.00	0.00	0.28	70969	377568
149	0.3	0.35	80000	1.05	0.00	1.00	0.00	0.31	66636	384431
150	0.3	0.40	80000	1.05	0.00	1.00	0.01	0.33	63013	376186
151	0.1	0.20	0	1.10	1.00	0.00	0.00	0.22	82944	357165
152	0.1	0.25	0	1.10	1.00	0.00	0.00	0.28	71347	385047
153	0.1	0.30	0	1.10	1.00	0.00	0.00	0.33	62192	411606
154	0.1	0.35	0	1.10	1.00	0.00	0.38	0.39	42484	371673
155	0.1	0.40	0	1.10	1.00	0.00	1.00	0.45	24453	332930
156	0.1	0.20	50000	1.10	1.00	0.00	0.00	0.22	82851	360380
157	0.1	0.25	50000	1.10	1.00	0.00	0.00	0.28	71425	381670
158	0.1	0.30	50000	1.10	1.00	0.00	0.00	0.33	62255	415142
159	0.1	0.35	50000	1.10	0.72	0.86	0.04	0.36	46280	370994
160	0.1	0.40	50000	1.10	0.01	1.00	0.48	0.36	40288	355479

Table 5: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
161	0.1	0.20	60000	1.10	1.00	0.00	0.00	0.22	82936	360445
162	0.1	0.25	60000	1.10	1.00	0.00	0.00	0.28	71300	378075
163	0.1	0.30	60000	1.10	1.00	0.24	0.00	0.33	62298	397458
164	0.1	0.35	60000	1.10	0.57	0.98	0.00	0.35	54324	400275
165	0.1	0.40	60000	1.10	0.02	1.00	0.01	0.35	48046	374338
166	0.1	0.20	70000	1.10	1.00	0.00	0.00	0.22	82889	353970
167	0.1	0.25	70000	1.10	1.00	0.29	0.00	0.28	71634	379499
168	0.1	0.30	70000	1.10	0.88	0.97	0.00	0.31	65600	403534
169	0.1	0.35	70000	1.10	0.27	1.00	0.00	0.34	61269	406075
170	0.1	0.40	70000	1.10	0.00	1.00	0.00	0.35	55903	393035
171	0.1	0.20	80000	1.10	1.00	0.19	0.00	0.22	83022	349023
172	0.1	0.25	80000	1.10	0.86	0.98	0.00	0.26	74743	363286
173	0.1	0.30	80000	1.10	0.16	1.00	0.00	0.29	69510	390868
174	0.1	0.35	80000	1.10	0.00	1.00	0.00	0.32	65218	393079
175	0.1	0.40	80000	1.10	0.00	1.00	0.00	0.34	61529	394147
176	0.2	0.20	0	1.10	1.00	0.00	0.00	0.22	82973	360422
177	0.2	0.25	0	1.10	1.00	0.00	0.00	0.28	71489	385697
178	0.2	0.30	0	1.10	1.00	0.00	0.01	0.33	62028	404589
179	0.2	0.35	0	1.10	1.00	0.00	0.44	0.39	41843	373185
180	0.2	0.40	0	1.10	1.00	0.00	0.94	0.45	24596	344920
181	0.2	0.20	50000	1.10	1.00	0.00	0.00	0.22	82818	374937
182	0.2	0.25	50000	1.10	1.00	0.00	0.00	0.28	71415	394996
183	0.2	0.30	50000	1.10	1.00	0.05	0.01	0.33	61908	404320
184	0.2	0.35	50000	1.10	0.65	0.76	0.17	0.36	46286	417111
185	0.2	0.40	50000	1.10	0.07	1.00	0.53	0.36	40316	342380
186	0.2	0.20	60000	1.10	1.00	0.00	0.00	0.22	82870	370027
187	0.2	0.25	60000	1.10	1.00	0.00	0.00	0.28	71500	380679
188	0.2	0.30	60000	1.10	0.98	0.28	0.00	0.33	62293	412978
189	0.2	0.35	60000	1.10	0.57	0.93	0.01	0.35	54344	414066
190	0.2	0.40	60000	1.10	0.05	1.00	0.09	0.36	48183	382160
191	0.2	0.20	70000	1.10	1.00	0.00	0.00	0.22	82986	361249
192	0.2	0.25	70000	1.10	1.00	0.35	0.00	0.28	71594	383359
193	0.2	0.30	70000	1.10	0.84	0.94	0.00	0.31	65507	398452
194	0.2	0.35	70000	1.10	0.29	1.00	0.00	0.34	61145	400958
195	0.2	0.40	70000	1.10	0.02	1.00	0.00	0.35	55674	388743
196	0.2	0.20	80000	1.10	1.00	0.22	0.00	0.22	82950	345072
197	0.2	0.25	80000	1.10	0.83	0.96	0.00	0.26	74759	370723
198	0.2	0.30	80000	1.10	0.20	1.00	0.00	0.29	69524	409894
199	0.2	0.35	80000	1.10	0.01	1.00	0.00	0.32	65299	394259
200	0.2	0.40	80000	1.10	0.00	1.00	0.00	0.34	61370	394177

Table 5: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
201	0.3	0.20	0	1.10	1.00	0.00	0.00	0.22	82892	378849
202	0.3	0.25	0	1.10	1.00	0.00	0.00	0.28	71328	358729
203	0.3	0.30	0	1.10	1.00	0.00	0.08	0.33	61857	421076
204	0.3	0.35	0	1.10	1.00	0.00	0.50	0.39	41473	396496
205	0.3	0.40	0	1.10	1.00	0.00	0.88	0.45	24659	308431
206	0.3	0.20	50000	1.10	1.00	0.00	0.00	0.22	82976	364035
207	0.3	0.25	50000	1.10	1.00	0.00	0.00	0.28	71593	395927
208	0.3	0.30	50000	1.10	0.97	0.12	0.06	0.33	61510	334860
209	0.3	0.35	50000	1.10	0.62	0.70	0.24	0.36	46283	385474
210	0.3	0.40	50000	1.10	0.14	0.97	0.50	0.36	40322	402870
211	0.3	0.20	60000	1.10	1.00	0.00	0.00	0.22	82930	364411
212	0.3	0.25	60000	1.10	1.00	0.01	0.00	0.28	71272	388653
213	0.3	0.30	60000	1.10	0.96	0.34	0.01	0.33	62188	412088
214	0.3	0.35	60000	1.10	0.54	0.85	0.08	0.35	54270	418058
215	0.3	0.40	60000	1.10	0.12	0.99	0.20	0.36	48241	419422
216	0.3	0.20	70000	1.10	1.00	0.00	0.00	0.22	82668	351251
217	0.3	0.25	70000	1.10	0.99	0.36	0.00	0.28	71453	400794
218	0.3	0.30	70000	1.10	0.80	0.90	0.01	0.31	65419	410300
219	0.3	0.35	70000	1.10	0.33	0.99	0.01	0.34	61204	409221
220	0.3	0.40	70000	1.10	0.05	1.00	0.06	0.35	55763	388466
221	0.3	0.20	80000	1.10	1.00	0.27	0.00	0.22	82950	337965
222	0.3	0.25	80000	1.10	0.81	0.94	0.00	0.26	74572	391349
223	0.3	0.30	80000	1.10	0.24	1.00	0.00	0.29	69460	362582
224	0.3	0.35	80000	1.10	0.02	1.00	0.01	0.32	65187	394712
225	0.3	0.40	80000	1.10	0.00	1.00	0.01	0.34	61460	388877
226	0.1	0.20	0	1.20	1.00	0.00	0.00	0.24	78026	369518
227	0.1	0.25	0	1.20	1.00	0.00	0.00	0.31	66454	398574
228	0.1	0.30	0	1.20	1.00	0.00	0.07	0.37	51022	374498
229	0.1	0.35	0	1.20	1.00	0.00	0.98	0.43	28400	359772
230	0.1	0.40	0	1.20	1.00	0.00	1.00	0.50	15213	324495
231	0.1	0.20	50000	1.20	1.00	0.00	0.00	0.24	77943	371088
232	0.1	0.25	50000	1.20	1.00	0.00	0.00	0.31	66590	399286
233	0.1	0.30	50000	1.20	1.00	0.42	0.01	0.37	51118	392863
234	0.1	0.35	50000	1.20	0.68	1.00	0.33	0.36	41388	372672
235	0.1	0.40	50000	1.20	0.02	1.00	0.91	0.36	36494	354727
236	0.1	0.20	60000	1.20	1.00	0.00	0.00	0.24	77871	364063
237	0.1	0.25	60000	1.20	1.00	0.02	0.00	0.31	66375	385947
238	0.1	0.30	60000	1.20	1.00	0.85	0.00	0.35	56766	402672
239	0.1	0.35	60000	1.20	0.60	1.00	0.00	0.35	49247	393015
240	0.1	0.40	60000	1.20	0.01	1.00	0.17	0.35	43526	354355

Table 5: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
241	0.1	0.20	70000	1.20	1.00	0.01	0.00	0.24	77843	369582
242	0.1	0.25	70000	1.20	1.00	0.78	0.00	0.30	67896	400830
243	0.1	0.30	70000	1.20	0.99	1.00	0.00	0.33	62676	405640
244	0.1	0.35	70000	1.20	0.55	1.00	0.00	0.35	57248	395351
245	0.1	0.40	70000	1.20	0.02	1.00	0.00	0.35	50779	370471
246	0.1	0.20	80000	1.20	1.00	0.65	0.00	0.24	78798	359402
247	0.1	0.25	80000	1.20	1.00	1.00	0.00	0.28	71717	388808
248	0.1	0.30	80000	1.20	0.73	1.00	0.00	0.31	66614	395068
249	0.1	0.35	80000	1.20	0.12	1.00	0.00	0.33	62330	406947
250	0.1	0.40	80000	1.20	0.00	1.00	0.00	0.35	57514	402245
251	0.2	0.20	0	1.20	1.00	0.00	0.00	0.24	77831	359781
252	0.2	0.25	0	1.20	1.00	0.00	0.00	0.31	66595	392413
253	0.2	0.30	0	1.20	1.00	0.00	0.20	0.37	50597	417039
254	0.2	0.35	0	1.20	1.00	0.00	0.90	0.43	27916	362844
255	0.2	0.40	0	1.20	1.00	0.00	1.00	0.50	14794	311039
256	0.2	0.20	50000	1.20	1.00	0.00	0.00	0.24	77989	377219
257	0.2	0.25	50000	1.20	1.00	0.00	0.00	0.31	66584	398405
258	0.2	0.30	50000	1.20	0.99	0.44	0.08	0.37	51368	402220
259	0.2	0.35	50000	1.20	0.62	0.98	0.40	0.36	41465	367994
260	0.2	0.40	50000	1.20	0.07	1.00	0.78	0.36	36479	349835
261	0.2	0.20	60000	1.20	1.00	0.00	0.00	0.24	77849	354180
262	0.2	0.25	60000	1.20	1.00	0.05	0.00	0.31	66812	393178
263	0.2	0.30	60000	1.20	0.99	0.80	0.00	0.35	56585	408542
264	0.2	0.35	60000	1.20	0.58	1.00	0.06	0.36	49460	370184
265	0.2	0.40	60000	1.20	0.06	1.00	0.27	0.36	43678	350794
266	0.2	0.20	70000	1.20	1.00	0.02	0.00	0.24	77827	371421
267	0.2	0.25	70000	1.20	1.00	0.76	0.00	0.30	67867	394760
268	0.2	0.30	70000	1.20	0.98	1.00	0.00	0.33	62525	406198
269	0.2	0.35	70000	1.20	0.53	1.00	0.00	0.35	57209	391875
270	0.2	0.40	70000	1.20	0.04	1.00	0.05	0.35	50787	359292
271	0.2	0.20	80000	1.20	1.00	0.64	0.00	0.24	78842	361907
272	0.2	0.25	80000	1.20	0.99	1.00	0.00	0.28	71684	383872
273	0.2	0.30	80000	1.20	0.70	1.00	0.00	0.31	66656	392596
274	0.2	0.35	80000	1.20	0.16	1.00	0.00	0.33	62367	421854
275	0.2	0.40	80000	1.20	0.01	1.00	0.00	0.35	57544	413150
276	0.3	0.20	0	1.20	1.00	0.00	0.00	0.24	78297	378324
277	0.3	0.25	0	1.20	1.00	0.00	0.01	0.31	66295	392605
278	0.3	0.30	0	1.20	1.00	0.00	0.31	0.37	50092	364550
279	0.3	0.35	0	1.20	1.00	0.00	0.83	0.43	28018	342727
280	0.3	0.40	0	1.20	1.00	0.00	0.99	0.50	14840	291441

Table 5: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
281	0.3	0.20	50000	1.20	1.00	0.00	0.00	0.24	78074	365488
282	0.3	0.25	50000	1.20	1.00	0.02	0.01	0.31	66406	367259
283	0.3	0.30	50000	1.20	0.96	0.49	0.15	0.37	50343	311477
284	0.3	0.35	50000	1.20	0.59	0.95	0.43	0.36	41521	356463
285	0.3	0.40	50000	1.20	0.13	1.00	0.72	0.36	36583	376098
286	0.3	0.20	60000	1.20	1.00	0.00	0.00	0.24	77856	356641
287	0.3	0.25	60000	1.20	1.00	0.10	0.00	0.31	66440	394598
288	0.3	0.30	60000	1.20	0.96	0.71	0.03	0.35	57001	423719
289	0.3	0.35	60000	1.20	0.56	0.98	0.15	0.36	49363	353706
290	0.3	0.40	60000	1.20	0.12	1.00	0.36	0.36	43728	388186
291	0.3	0.20	70000	1.20	1.00	0.05	0.00	0.24	78275	370470
292	0.3	0.25	70000	1.20	1.00	0.72	0.00	0.30	67872	360301
293	0.3	0.30	70000	1.20	0.95	0.99	0.01	0.33	62693	367085
294	0.3	0.35	70000	1.20	0.52	1.00	0.04	0.35	56983	442377
295	0.3	0.40	70000	1.20	0.10	1.00	0.11	0.36	50862	384061
296	0.3	0.20	80000	1.20	1.00	0.62	0.00	0.24	78693	367107
297	0.3	0.25	80000	1.20	0.98	0.99	0.00	0.28	71920	426398
298	0.3	0.30	80000	1.20	0.66	1.00	0.00	0.31	66591	408162
299	0.3	0.35	80000	1.20	0.22	1.00	0.01	0.33	62292	404481
300	0.3	0.40	80000	1.20	0.03	1.00	0.04	0.35	57395	371343



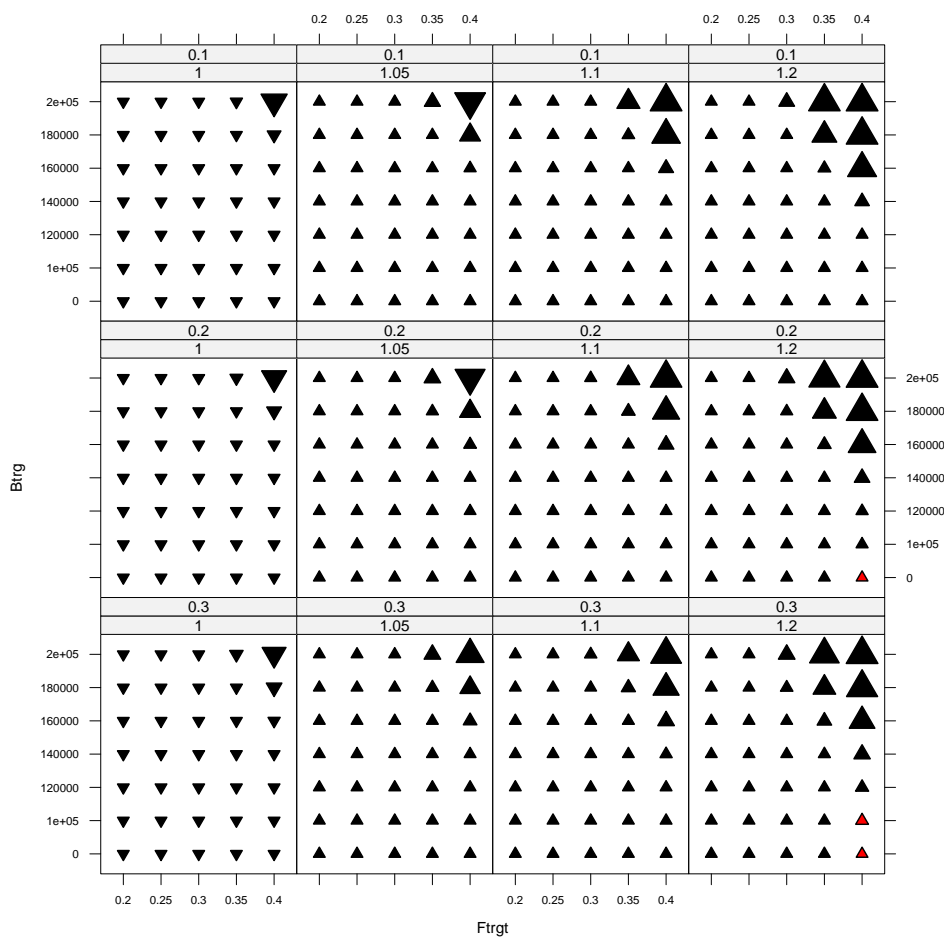


Figure 14: Western Baltic spring spawning herring risk analysis

Table 6: Western Baltic spring spawning herring - metrics measured in 2029

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
1	0.1	0.20	0	1.00	0.27	0.00	0.00	0.20	358278	1387388
2	0.1	0.25	0	1.00	0.30	0.00	0.00	0.25	298086	1484093
3	0.1	0.30	0	1.00	0.34	0.00	0.00	0.30	252995	1577352
4	0.1	0.35	0	1.00	0.25	0.00	0.00	0.35	216826	1641595
5	0.1	0.40	0	1.00	0.31	0.00	0.00	0.40	187589	1707477
6	0.1	0.20	100000	1.00	0.26	0.00	0.00	0.20	358125	1382052
7	0.1	0.25	100000	1.00	0.26	0.00	0.00	0.25	298886	1495018
8	0.1	0.30	100000	1.00	0.33	0.00	0.00	0.30	252274	1570833
9	0.1	0.35	100000	1.00	0.28	0.00	0.00	0.35	216825	1612035
10	0.1	0.40	100000	1.00	0.28	0.00	0.00	0.40	187668	1704768
11	0.1	0.20	120000	1.00	0.26	0.00	0.00	0.20	357876	1387416
12	0.1	0.25	120000	1.00	0.28	0.00	0.00	0.25	299342	1505117
13	0.1	0.30	120000	1.00	0.33	0.00	0.00	0.30	253074	1615765
14	0.1	0.35	120000	1.00	0.27	0.00	0.00	0.35	216437	1615795
15	0.1	0.40	120000	1.00	0.31	0.00	0.00	0.40	187766	1742046
16	0.1	0.20	140000	1.00	0.26	0.00	0.00	0.20	357983	1412648
17	0.1	0.25	140000	1.00	0.27	0.00	0.00	0.25	298860	1496770
18	0.1	0.30	140000	1.00	0.32	0.00	0.00	0.30	252619	1622256
19	0.1	0.35	140000	1.00	0.26	0.00	0.00	0.35	216306	1658345
20	0.1	0.40	140000	1.00	0.30	0.00	0.00	0.40	187643	1741487
21	0.1	0.20	160000	1.00	0.26	0.00	0.00	0.20	358457	1407384
22	0.1	0.25	160000	1.00	0.28	0.00	0.00	0.25	299134	1535753
23	0.1	0.30	160000	1.00	0.37	0.00	0.00	0.30	253465	1624536
24	0.1	0.35	160000	1.00	0.23	0.00	0.00	0.35	216816	1688826
25	0.1	0.40	160000	1.00	0.32	0.00	0.00	0.40	187343	1713919
26	0.1	0.20	180000	1.00	0.25	0.00	0.00	0.20	358523	1386391
27	0.1	0.25	180000	1.00	0.26	0.00	0.00	0.25	298796	1525802
28	0.1	0.30	180000	1.00	0.32	0.00	0.00	0.30	252965	1587145
29	0.1	0.35	180000	1.00	0.27	0.00	0.00	0.35	216238	1681917
30	0.1	0.40	180000	1.00	0.27	0.16	0.00	0.40	187930	1698225
31	0.1	0.20	200000	1.00	0.27	0.00	0.00	0.20	358952	1390234
32	0.1	0.25	200000	1.00	0.27	0.00	0.00	0.25	299766	1508259
33	0.1	0.30	200000	1.00	0.33	0.00	0.00	0.30	252774	1597673
34	0.1	0.35	200000	1.00	0.27	0.04	0.00	0.35	216645	1686622
35	0.1	0.40	200000	1.00	0.06	0.81	0.00	0.39	194359	1694775
36	0.2	0.20	0	1.00	0.28	0.00	0.00	0.20	357505	1366697
37	0.2	0.25	0	1.00	0.28	0.00	0.00	0.25	298772	1564139
38	0.2	0.30	0	1.00	0.34	0.00	0.00	0.30	252375	1617651
39	0.2	0.35	0	1.00	0.26	0.00	0.00	0.35	215688	1754317
40	0.2	0.40	0	1.00	0.30	0.00	0.00	0.40	186653	1741059

Table 6: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
41	0.2	0.20	100000	1.00	0.26	0.00	0.00	0.20	358111	1480951
42	0.2	0.25	100000	1.00	0.25	0.00	0.00	0.25	298618	1502214
43	0.2	0.30	100000	1.00	0.33	0.00	0.00	0.30	252868	1594768
44	0.2	0.35	100000	1.00	0.28	0.00	0.00	0.35	216272	1711968
45	0.2	0.40	100000	1.00	0.28	0.00	0.00	0.40	187721	1751782
46	0.2	0.20	120000	1.00	0.23	0.00	0.00	0.20	358098	1344309
47	0.2	0.25	120000	1.00	0.25	0.00	0.00	0.25	298168	1422555
48	0.2	0.30	120000	1.00	0.37	0.00	0.00	0.30	252768	1603976
49	0.2	0.35	120000	1.00	0.26	0.00	0.00	0.35	216341	1684954
50	0.2	0.40	120000	1.00	0.29	0.00	0.00	0.40	187138	1652130
51	0.2	0.20	140000	1.00	0.24	0.00	0.00	0.20	357700	1333392
52	0.2	0.25	140000	1.00	0.27	0.00	0.00	0.25	299852	1456204
53	0.2	0.30	140000	1.00	0.35	0.00	0.00	0.30	252801	1650559
54	0.2	0.35	140000	1.00	0.27	0.00	0.00	0.35	216419	1714153
55	0.2	0.40	140000	1.00	0.30	0.00	0.00	0.40	187760	1710708
56	0.2	0.20	160000	1.00	0.27	0.00	0.00	0.20	358125	1388556
57	0.2	0.25	160000	1.00	0.24	0.00	0.00	0.25	299429	1525161
58	0.2	0.30	160000	1.00	0.36	0.00	0.00	0.30	253304	1611473
59	0.2	0.35	160000	1.00	0.27	0.00	0.00	0.35	216938	1771273
60	0.2	0.40	160000	1.00	0.30	0.01	0.00	0.40	188200	1660777
61	0.2	0.20	180000	1.00	0.26	0.00	0.00	0.20	358582	1327714
62	0.2	0.25	180000	1.00	0.28	0.00	0.00	0.25	298638	1518715
63	0.2	0.30	180000	1.00	0.35	0.00	0.00	0.30	253232	1622081
64	0.2	0.35	180000	1.00	0.28	0.00	0.00	0.35	216547	1670676
65	0.2	0.40	180000	1.00	0.24	0.24	0.00	0.40	188500	1702931
66	0.2	0.20	200000	1.00	0.25	0.00	0.00	0.20	357776	1408915
67	0.2	0.25	200000	1.00	0.26	0.00	0.00	0.25	298799	1486044
68	0.2	0.30	200000	1.00	0.32	0.00	0.00	0.30	252946	1561917
69	0.2	0.35	200000	1.00	0.25	0.09	0.00	0.35	216132	1736259
70	0.2	0.40	200000	1.00	0.08	0.76	0.00	0.39	194593	1611718
71	0.3	0.20	0	1.00	0.26	0.00	0.00	0.20	358869	1457761
72	0.3	0.25	0	1.00	0.25	0.00	0.00	0.25	299051	1624557
73	0.3	0.30	0	1.00	0.32	0.00	0.00	0.30	252926	1653176
74	0.3	0.35	0	1.00	0.29	0.00	0.00	0.35	215203	1663262
75	0.3	0.40	0	1.00	0.30	0.00	0.00	0.40	187691	1826827
76	0.3	0.20	100000	1.00	0.28	0.00	0.00	0.20	358300	1366525
77	0.3	0.25	100000	1.00	0.25	0.00	0.00	0.25	300063	1544270
78	0.3	0.30	100000	1.00	0.35	0.00	0.00	0.30	253991	1618592
79	0.3	0.35	100000	1.00	0.28	0.00	0.00	0.35	216153	1674835
80	0.3	0.40	100000	1.00	0.30	0.00	0.00	0.40	187592	1624738

Table 6: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
81	0.3	0.20	120000	1.00	0.27	0.00	0.00	0.20	357255	1312608
82	0.3	0.25	120000	1.00	0.26	0.00	0.00	0.25	298613	1549724
83	0.3	0.30	120000	1.00	0.35	0.00	0.00	0.30	252553	1555928
84	0.3	0.35	120000	1.00	0.26	0.00	0.00	0.35	216203	1709091
85	0.3	0.40	120000	1.00	0.28	0.00	0.00	0.40	187845	1692377
86	0.3	0.20	140000	1.00	0.28	0.00	0.00	0.20	357488	1366068
87	0.3	0.25	140000	1.00	0.29	0.00	0.00	0.25	298726	1421509
88	0.3	0.30	140000	1.00	0.37	0.00	0.00	0.30	252547	1659419
89	0.3	0.35	140000	1.00	0.26	0.00	0.00	0.35	217038	1755900
90	0.3	0.40	140000	1.00	0.30	0.00	0.00	0.40	187196	1765767
91	0.3	0.20	160000	1.00	0.26	0.00	0.00	0.20	357480	1390037
92	0.3	0.25	160000	1.00	0.28	0.00	0.00	0.25	298199	1450628
93	0.3	0.30	160000	1.00	0.33	0.00	0.00	0.30	253492	1522075
94	0.3	0.35	160000	1.00	0.25	0.00	0.00	0.35	216372	1584724
95	0.3	0.40	160000	1.00	0.30	0.04	0.00	0.40	187730	1796767
96	0.3	0.20	180000	1.00	0.27	0.00	0.00	0.20	358343	1434341
97	0.3	0.25	180000	1.00	0.24	0.00	0.00	0.25	299238	1437775
98	0.3	0.30	180000	1.00	0.33	0.00	0.00	0.30	251939	1585039
99	0.3	0.35	180000	1.00	0.28	0.01	0.00	0.35	215844	1684082
100	0.3	0.40	180000	1.00	0.22	0.29	0.00	0.40	187024	1746583
101	0.3	0.20	200000	1.00	0.27	0.00	0.00	0.20	356426	1487412
102	0.3	0.25	200000	1.00	0.25	0.00	0.00	0.25	298294	1613924
103	0.3	0.30	200000	1.00	0.33	0.00	0.00	0.30	252570	1783979
104	0.3	0.35	200000	1.00	0.26	0.14	0.00	0.35	217171	1701220
105	0.3	0.40	200000	1.00	0.09	0.72	0.00	0.39	194345	1812667
106	0.1	0.20	0	1.05	1.00	0.00	0.00	0.21	343460	1411995
107	0.1	0.25	0	1.05	1.00	0.00	0.00	0.26	284915	1513259
108	0.1	0.30	0	1.05	1.00	0.00	0.00	0.32	239455	1635326
109	0.1	0.35	0	1.05	1.00	0.00	0.00	0.37	204030	1642226
110	0.1	0.40	0	1.05	1.00	0.00	0.00	0.42	175736	1736838
111	0.1	0.20	100000	1.05	1.00	0.00	0.00	0.21	344024	1414279
112	0.1	0.25	100000	1.05	1.00	0.00	0.00	0.26	284349	1570616
113	0.1	0.30	100000	1.05	1.00	0.00	0.00	0.32	239619	1596086
114	0.1	0.35	100000	1.05	1.00	0.00	0.00	0.37	204268	1674337
115	0.1	0.40	100000	1.05	1.00	0.00	0.00	0.42	175829	1666903
116	0.1	0.20	120000	1.05	1.00	0.00	0.00	0.21	343787	1414210
117	0.1	0.25	120000	1.05	1.00	0.00	0.00	0.26	284946	1543170
118	0.1	0.30	120000	1.05	1.00	0.00	0.00	0.32	240206	1621401
119	0.1	0.35	120000	1.05	1.00	0.00	0.00	0.37	204461	1660722
120	0.1	0.40	120000	1.05	1.00	0.00	0.00	0.42	175684	1765833

Table 6: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
121	0.1	0.20	140000	1.05	1.00	0.00	0.00	0.21	343947	1421399
122	0.1	0.25	140000	1.05	1.00	0.00	0.00	0.26	285010	1542466
123	0.1	0.30	140000	1.05	1.00	0.00	0.00	0.32	239875	1619260
124	0.1	0.35	140000	1.05	1.00	0.00	0.00	0.37	204301	1705175
125	0.1	0.40	140000	1.05	1.00	0.00	0.00	0.42	175921	1757225
126	0.1	0.20	160000	1.05	1.00	0.00	0.00	0.21	343957	1406053
127	0.1	0.25	160000	1.05	1.00	0.00	0.00	0.26	284708	1539743
128	0.1	0.30	160000	1.05	1.00	0.00	0.00	0.32	239395	1603215
129	0.1	0.35	160000	1.05	1.00	0.00	0.00	0.37	204222	1694846
130	0.1	0.40	160000	1.05	1.00	0.04	0.00	0.42	176210	1729543
131	0.1	0.20	180000	1.05	1.00	0.00	0.00	0.21	343772	1378015
132	0.1	0.25	180000	1.05	1.00	0.00	0.00	0.26	284785	1551459
133	0.1	0.30	180000	1.05	1.00	0.00	0.00	0.32	239457	1596003
134	0.1	0.35	180000	1.05	1.00	0.00	0.00	0.37	204213	1715748
135	0.1	0.40	180000	1.05	0.94	0.58	0.00	0.42	178785	1734971
136	0.1	0.20	200000	1.05	1.00	0.00	0.00	0.21	343830	1389525
137	0.1	0.25	200000	1.05	1.00	0.00	0.00	0.26	284964	1532233
138	0.1	0.30	200000	1.05	1.00	0.00	0.00	0.32	239818	1666755
139	0.1	0.35	200000	1.05	0.99	0.31	0.00	0.37	204415	1662141
140	0.1	0.40	200000	1.05	0.46	0.97	0.00	0.40	188269	1710918
141	0.2	0.20	0	1.05	1.00	0.00	0.00	0.21	343984	1460863
142	0.2	0.25	0	1.05	1.00	0.00	0.00	0.26	283697	1611708
143	0.2	0.30	0	1.05	1.00	0.00	0.00	0.32	239482	1650283
144	0.2	0.35	0	1.05	1.00	0.00	0.00	0.37	204094	1676247
145	0.2	0.40	0	1.05	1.00	0.00	0.00	0.42	175731	1793266
146	0.2	0.20	100000	1.05	1.00	0.00	0.00	0.21	342912	1424389
147	0.2	0.25	100000	1.05	1.00	0.00	0.00	0.26	285507	1615522
148	0.2	0.30	100000	1.05	1.00	0.00	0.00	0.32	239706	1580816
149	0.2	0.35	100000	1.05	1.00	0.00	0.00	0.37	204311	1730452
150	0.2	0.40	100000	1.05	1.00	0.00	0.00	0.42	175812	1673243
151	0.2	0.20	120000	1.05	1.00	0.00	0.00	0.21	343727	1465718
152	0.2	0.25	120000	1.05	1.00	0.00	0.00	0.26	284312	1562461
153	0.2	0.30	120000	1.05	1.00	0.00	0.00	0.32	238222	1621777
154	0.2	0.35	120000	1.05	1.00	0.00	0.00	0.37	203752	1685700
155	0.2	0.40	120000	1.05	1.00	0.00	0.00	0.42	175539	1714677
156	0.2	0.20	140000	1.05	1.00	0.00	0.00	0.21	343518	1429842
157	0.2	0.25	140000	1.05	1.00	0.00	0.00	0.26	285100	1585134
158	0.2	0.30	140000	1.05	1.00	0.00	0.00	0.32	239718	1514231
159	0.2	0.35	140000	1.05	1.00	0.00	0.00	0.37	204700	1637399
160	0.2	0.40	140000	1.05	1.00	0.00	0.00	0.42	174834	1751675

Table 6: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
161	0.2	0.20	160000	1.05	1.00	0.00	0.00	0.21	343809	1408985
162	0.2	0.25	160000	1.05	1.00	0.00	0.00	0.26	284520	1631759
163	0.2	0.30	160000	1.05	1.00	0.00	0.00	0.32	239224	1638871
164	0.2	0.35	160000	1.05	1.00	0.00	0.00	0.37	204256	1792801
165	0.2	0.40	160000	1.05	1.00	0.08	0.00	0.42	176120	1712094
166	0.2	0.20	180000	1.05	1.00	0.00	0.00	0.21	343911	1368924
167	0.2	0.25	180000	1.05	1.00	0.00	0.00	0.26	285143	1574752
168	0.2	0.30	180000	1.05	1.00	0.00	0.00	0.32	239964	1590912
169	0.2	0.35	180000	1.05	1.00	0.03	0.00	0.37	203927	1737599
170	0.2	0.40	180000	1.05	0.90	0.58	0.00	0.42	178600	1768306
171	0.2	0.20	200000	1.05	1.00	0.00	0.00	0.21	343836	1444859
172	0.2	0.25	200000	1.05	1.00	0.00	0.00	0.26	284771	1533290
173	0.2	0.30	200000	1.05	1.00	0.00	0.00	0.32	239573	1621574
174	0.2	0.35	200000	1.05	0.96	0.35	0.00	0.37	204375	1691078
175	0.2	0.40	200000	1.05	0.47	0.94	0.00	0.40	188482	1715884
176	0.3	0.20	0	1.05	1.00	0.00	0.00	0.21	342792	1520885
177	0.3	0.25	0	1.05	1.00	0.00	0.00	0.26	286148	1589392
178	0.3	0.30	0	1.05	1.00	0.00	0.00	0.32	239865	1534511
179	0.3	0.35	0	1.05	1.00	0.00	0.00	0.37	203653	1625326
180	0.3	0.40	0	1.05	1.00	0.00	0.01	0.42	175797	1672458
181	0.3	0.20	100000	1.05	1.00	0.00	0.00	0.21	343567	1477163
182	0.3	0.25	100000	1.05	1.00	0.00	0.00	0.26	284931	1616636
183	0.3	0.30	100000	1.05	1.00	0.00	0.00	0.32	238978	1717604
184	0.3	0.35	100000	1.05	1.00	0.00	0.00	0.37	203597	1799296
185	0.3	0.40	100000	1.05	1.00	0.00	0.00	0.42	176421	1511720
186	0.3	0.20	120000	1.05	1.00	0.00	0.00	0.21	343550	1350798
187	0.3	0.25	120000	1.05	1.00	0.00	0.00	0.26	285162	1564905
188	0.3	0.30	120000	1.05	1.00	0.00	0.00	0.32	239912	1558282
189	0.3	0.35	120000	1.05	1.00	0.00	0.00	0.37	203906	1706097
190	0.3	0.40	120000	1.05	1.00	0.00	0.00	0.42	176002	1675518
191	0.3	0.20	140000	1.05	1.00	0.00	0.00	0.21	343307	1476894
192	0.3	0.25	140000	1.05	1.00	0.00	0.00	0.26	285135	1491836
193	0.3	0.30	140000	1.05	1.00	0.00	0.00	0.32	239654	1719479
194	0.3	0.35	140000	1.05	1.00	0.00	0.00	0.37	204668	1766901
195	0.3	0.40	140000	1.05	1.00	0.01	0.00	0.42	176266	1746669
196	0.3	0.20	160000	1.05	1.00	0.00	0.00	0.21	344806	1316858
197	0.3	0.25	160000	1.05	1.00	0.00	0.00	0.26	283936	1544146
198	0.3	0.30	160000	1.05	1.00	0.00	0.00	0.32	239320	1703930
199	0.3	0.35	160000	1.05	1.00	0.00	0.00	0.37	203014	1678443
200	0.3	0.40	160000	1.05	0.98	0.15	0.00	0.42	175124	1562176

Table 6: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
201	0.3	0.20	180000	1.05	1.00	0.00	0.00	0.21	343177	1517991
202	0.3	0.25	180000	1.05	1.00	0.00	0.00	0.26	285098	1626953
203	0.3	0.30	180000	1.05	1.00	0.00	0.00	0.32	240984	1693262
204	0.3	0.35	180000	1.05	0.99	0.09	0.00	0.37	204516	1629143
205	0.3	0.40	180000	1.05	0.84	0.55	0.00	0.42	178745	1630701
206	0.3	0.20	200000	1.05	1.00	0.00	0.00	0.21	343026	1274746
207	0.3	0.25	200000	1.05	1.00	0.00	0.00	0.26	285096	1467154
208	0.3	0.30	200000	1.05	1.00	0.01	0.00	0.32	239769	1705342
209	0.3	0.35	200000	1.05	0.94	0.35	0.00	0.37	205728	1700058
210	0.3	0.40	200000	1.05	0.50	0.87	0.00	0.40	188864	1695434
211	0.1	0.20	0	1.10	1.00	0.00	0.00	0.22	330779	1451669
212	0.1	0.25	0	1.10	1.00	0.00	0.00	0.28	272092	1554983
213	0.1	0.30	0	1.10	1.00	0.00	0.00	0.33	227066	1660634
214	0.1	0.35	0	1.10	1.00	0.00	0.00	0.39	192682	1733377
215	0.1	0.40	0	1.10	1.00	0.00	0.00	0.45	164469	1661015
216	0.1	0.20	100000	1.10	1.00	0.00	0.00	0.22	330445	1462446
217	0.1	0.25	100000	1.10	1.00	0.00	0.00	0.28	271150	1551972
218	0.1	0.30	100000	1.10	1.00	0.00	0.00	0.33	226902	1579999
219	0.1	0.35	100000	1.10	1.00	0.00	0.00	0.39	192678	1684016
220	0.1	0.40	100000	1.10	1.00	0.00	0.00	0.45	164758	1639012
221	0.1	0.20	120000	1.10	1.00	0.00	0.00	0.22	329550	1455364
222	0.1	0.25	120000	1.10	1.00	0.00	0.00	0.28	271431	1548931
223	0.1	0.30	120000	1.10	1.00	0.00	0.00	0.33	227279	1609929
224	0.1	0.35	120000	1.10	1.00	0.00	0.00	0.39	192543	1668798
225	0.1	0.40	120000	1.10	1.00	0.00	0.00	0.45	164674	1769209
226	0.1	0.20	140000	1.10	1.00	0.00	0.00	0.22	329924	1431028
227	0.1	0.25	140000	1.10	1.00	0.00	0.00	0.28	271436	1544746
228	0.1	0.30	140000	1.10	1.00	0.00	0.00	0.33	226504	1622396
229	0.1	0.35	140000	1.10	1.00	0.00	0.00	0.39	192576	1725576
230	0.1	0.40	140000	1.10	1.00	0.00	0.00	0.45	164508	1718922
231	0.1	0.20	160000	1.10	1.00	0.00	0.00	0.22	330574	1448689
232	0.1	0.25	160000	1.10	1.00	0.00	0.00	0.28	271936	1594041
233	0.1	0.30	160000	1.10	1.00	0.00	0.00	0.33	227134	1650244
234	0.1	0.35	160000	1.10	1.00	0.00	0.00	0.39	192943	1737094
235	0.1	0.40	160000	1.10	1.00	0.24	0.00	0.45	165679	1738248
236	0.1	0.20	180000	1.10	1.00	0.00	0.00	0.22	330218	1426775
237	0.1	0.25	180000	1.10	1.00	0.00	0.00	0.28	271915	1549771
238	0.1	0.30	180000	1.10	1.00	0.00	0.00	0.33	227089	1619300
239	0.1	0.35	180000	1.10	1.00	0.07	0.00	0.39	192378	1746998
240	0.1	0.40	180000	1.10	0.99	0.89	0.00	0.43	172878	1742998

Table 6: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
241	0.1	0.20	200000	1.10	1.00	0.00	0.00	0.22	330336	1442437
242	0.1	0.25	200000	1.10	1.00	0.00	0.00	0.28	271701	1551028
243	0.1	0.30	200000	1.10	1.00	0.00	0.00	0.33	227077	1676088
244	0.1	0.35	200000	1.10	1.00	0.68	0.00	0.39	196682	1742828
245	0.1	0.40	200000	1.10	0.77	1.00	0.00	0.41	182915	1724299
246	0.2	0.20	0	1.10	1.00	0.00	0.00	0.22	329477	1429791
247	0.2	0.25	0	1.10	1.00	0.00	0.00	0.28	270977	1543578
248	0.2	0.30	0	1.10	1.00	0.00	0.00	0.33	226499	1720348
249	0.2	0.35	0	1.10	1.00	0.00	0.00	0.39	191723	1446734
250	0.2	0.40	0	1.10	1.00	0.00	0.00	0.45	165261	1669840
251	0.2	0.20	100000	1.10	1.00	0.00	0.00	0.22	330071	1496175
252	0.2	0.25	100000	1.10	1.00	0.00	0.00	0.28	271579	1470558
253	0.2	0.30	100000	1.10	1.00	0.00	0.00	0.33	226093	1665011
254	0.2	0.35	100000	1.10	1.00	0.00	0.00	0.39	191850	1766712
255	0.2	0.40	100000	1.10	1.00	0.00	0.00	0.45	164661	1857246
256	0.2	0.20	120000	1.10	1.00	0.00	0.00	0.22	330230	1376188
257	0.2	0.25	120000	1.10	1.00	0.00	0.00	0.28	271967	1558971
258	0.2	0.30	120000	1.10	1.00	0.00	0.00	0.33	227270	1662130
259	0.2	0.35	120000	1.10	1.00	0.00	0.00	0.39	193105	1725322
260	0.2	0.40	120000	1.10	1.00	0.00	0.00	0.45	165311	1798490
261	0.2	0.20	140000	1.10	1.00	0.00	0.00	0.22	330104	1322526
262	0.2	0.25	140000	1.10	1.00	0.00	0.00	0.28	272162	1529803
263	0.2	0.30	140000	1.10	1.00	0.00	0.00	0.33	226732	1720026
264	0.2	0.35	140000	1.10	1.00	0.00	0.00	0.39	191791	1578262
265	0.2	0.40	140000	1.10	1.00	0.01	0.00	0.45	164995	1756287
266	0.2	0.20	160000	1.10	1.00	0.00	0.00	0.22	330656	1408894
267	0.2	0.25	160000	1.10	1.00	0.00	0.00	0.28	271611	1654920
268	0.2	0.30	160000	1.10	1.00	0.00	0.00	0.33	227638	1668609
269	0.2	0.35	160000	1.10	1.00	0.00	0.00	0.39	192881	1783704
270	0.2	0.40	160000	1.10	1.00	0.29	0.00	0.45	165123	1696215
271	0.2	0.20	180000	1.10	1.00	0.00	0.00	0.22	330010	1396204
272	0.2	0.25	180000	1.10	1.00	0.00	0.00	0.28	271985	1602744
273	0.2	0.30	180000	1.10	1.00	0.00	0.00	0.33	226838	1672323
274	0.2	0.35	180000	1.10	1.00	0.14	0.00	0.39	192666	1785623
275	0.2	0.40	180000	1.10	0.98	0.84	0.00	0.43	172673	1775015
276	0.2	0.20	200000	1.10	1.00	0.00	0.00	0.22	329878	1488542
277	0.2	0.25	200000	1.10	1.00	0.00	0.00	0.28	271784	1520136
278	0.2	0.30	200000	1.10	1.00	0.02	0.00	0.33	226529	1708375
279	0.2	0.35	200000	1.10	1.00	0.66	0.00	0.39	196400	1680441
280	0.2	0.40	200000	1.10	0.72	0.99	0.00	0.41	182783	1686438



Table 6: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
281	0.3	0.20	0	1.10	1.00	0.00	0.00	0.22	329981	1582235
282	0.3	0.25	0	1.10	1.00	0.00	0.00	0.28	271057	1606909
283	0.3	0.30	0	1.10	1.00	0.00	0.00	0.33	226296	1618374
284	0.3	0.35	0	1.10	1.00	0.00	0.00	0.39	192175	1572968
285	0.3	0.40	0	1.10	1.00	0.00	0.02	0.45	164355	1528483
286	0.3	0.20	100000	1.10	1.00	0.00	0.00	0.22	330142	1431036
287	0.3	0.25	100000	1.10	1.00	0.00	0.00	0.28	270233	1505089
288	0.3	0.30	100000	1.10	1.00	0.00	0.00	0.33	227316	1717451
289	0.3	0.35	100000	1.10	1.00	0.00	0.00	0.39	193308	1777511
290	0.3	0.40	100000	1.10	1.00	0.01	0.01	0.45	164856	1895394
291	0.3	0.20	120000	1.10	1.00	0.00	0.00	0.22	330652	1445485
292	0.3	0.25	120000	1.10	1.00	0.00	0.00	0.28	273694	1644052
293	0.3	0.30	120000	1.10	1.00	0.00	0.00	0.33	226377	1657262
294	0.3	0.35	120000	1.10	1.00	0.00	0.00	0.39	192854	1618701
295	0.3	0.40	120000	1.10	1.00	0.00	0.01	0.45	164822	1698788
296	0.3	0.20	140000	1.10	1.00	0.00	0.00	0.22	329924	1370141
297	0.3	0.25	140000	1.10	1.00	0.00	0.00	0.28	271226	1519033
298	0.3	0.30	140000	1.10	1.00	0.00	0.00	0.33	227748	1788101
299	0.3	0.35	140000	1.10	1.00	0.00	0.00	0.39	193670	1603575
300	0.3	0.40	140000	1.10	1.00	0.05	0.00	0.45	164175	1725565
301	0.3	0.20	160000	1.10	1.00	0.00	0.00	0.22	330928	1551543
302	0.3	0.25	160000	1.10	1.00	0.00	0.00	0.28	271884	1572657
303	0.3	0.30	160000	1.10	1.00	0.00	0.00	0.33	225379	1623547
304	0.3	0.35	160000	1.10	1.00	0.01	0.00	0.39	191765	1857891
305	0.3	0.40	160000	1.10	1.00	0.35	0.00	0.45	165092	1593963
306	0.3	0.20	180000	1.10	1.00	0.00	0.00	0.22	328922	1414151
307	0.3	0.25	180000	1.10	1.00	0.00	0.00	0.28	272265	1557779
308	0.3	0.30	180000	1.10	1.00	0.00	0.00	0.33	227711	1711515
309	0.3	0.35	180000	1.10	1.00	0.19	0.00	0.39	192936	1737976
310	0.3	0.40	180000	1.10	0.94	0.80	0.00	0.43	172329	1765336
311	0.3	0.20	200000	1.10	1.00	0.00	0.00	0.22	329697	1334699
312	0.3	0.25	200000	1.10	1.00	0.00	0.00	0.28	270591	1488148
313	0.3	0.30	200000	1.10	1.00	0.05	0.00	0.33	226417	1645442
314	0.3	0.35	200000	1.10	0.98	0.63	0.00	0.39	196499	1736704
315	0.3	0.40	200000	1.10	0.69	0.97	0.00	0.41	183210	1670434
316	0.1	0.20	0	1.20	1.00	0.00	0.00	0.24	305047	1507582
317	0.1	0.25	0	1.20	1.00	0.00	0.00	0.31	247515	1579242
318	0.1	0.30	0	1.20	1.00	0.00	0.00	0.37	204592	1689654
319	0.1	0.35	0	1.20	1.00	0.00	0.00	0.43	171357	1697213
320	0.1	0.40	0	1.20	1.00	0.00	0.00	0.50	142895	1543606

Table 6: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
321	0.1	0.20	100000	1.20	1.00	0.00	0.00	0.24	304611	1470019
322	0.1	0.25	100000	1.20	1.00	0.00	0.00	0.31	247220	1611542
323	0.1	0.30	100000	1.20	1.00	0.00	0.00	0.37	204147	1731096
324	0.1	0.35	100000	1.20	1.00	0.00	0.00	0.43	171114	1686462
325	0.1	0.40	100000	1.20	1.00	0.00	0.00	0.50	143418	1509569
326	0.1	0.20	120000	1.20	1.00	0.00	0.00	0.24	305503	1511883
327	0.1	0.25	120000	1.20	1.00	0.00	0.00	0.31	247959	1576857
328	0.1	0.30	120000	1.20	1.00	0.00	0.00	0.37	204438	1694889
329	0.1	0.35	120000	1.20	1.00	0.00	0.00	0.43	171476	1754233
330	0.1	0.40	120000	1.20	1.00	0.00	0.00	0.50	144957	1711479
331	0.1	0.20	140000	1.20	1.00	0.00	0.00	0.24	304359	1518136
332	0.1	0.25	140000	1.20	1.00	0.00	0.00	0.31	247034	1589542
333	0.1	0.30	140000	1.20	1.00	0.00	0.00	0.37	204124	1676262
334	0.1	0.35	140000	1.20	1.00	0.00	0.00	0.43	170753	1765146
335	0.1	0.40	140000	1.20	1.00	0.21	0.00	0.50	145782	1765855
336	0.1	0.20	160000	1.20	1.00	0.00	0.00	0.24	304683	1482237
337	0.1	0.25	160000	1.20	1.00	0.00	0.00	0.31	247534	1593092
338	0.1	0.30	160000	1.20	1.00	0.00	0.00	0.37	204886	1675432
339	0.1	0.35	160000	1.20	1.00	0.09	0.00	0.43	171319	1736560
340	0.1	0.40	160000	1.20	1.00	0.91	0.00	0.48	152663	1783379
341	0.1	0.20	180000	1.20	1.00	0.00	0.00	0.24	304710	1486146
342	0.1	0.25	180000	1.20	1.00	0.00	0.00	0.31	247051	1611664
343	0.1	0.30	180000	1.20	1.00	0.00	0.00	0.37	204548	1716174
344	0.1	0.35	180000	1.20	1.00	0.75	0.00	0.43	175732	1718632
345	0.1	0.40	180000	1.20	1.00	1.00	0.00	0.45	163127	1754243
346	0.1	0.20	200000	1.20	1.00	0.00	0.00	0.24	304667	1487381
347	0.1	0.25	200000	1.20	1.00	0.00	0.00	0.31	247526	1599414
348	0.1	0.30	200000	1.20	1.00	0.29	0.00	0.37	205626	1694214
349	0.1	0.35	200000	1.20	1.00	0.99	0.00	0.40	185792	1680415
350	0.1	0.40	200000	1.20	0.99	1.00	0.00	0.43	173165	1693512
351	0.2	0.20	0	1.20	1.00	0.00	0.00	0.24	303747	1502944
352	0.2	0.25	0	1.20	1.00	0.00	0.00	0.31	247433	1600350
353	0.2	0.30	0	1.20	1.00	0.00	0.00	0.37	204506	1598272
354	0.2	0.35	0	1.20	1.00	0.00	0.00	0.43	171330	1816652
355	0.2	0.40	0	1.20	1.00	0.00	0.06	0.50	141310	1787734
356	0.2	0.20	100000	1.20	1.00	0.00	0.00	0.24	304256	1455954
357	0.2	0.25	100000	1.20	1.00	0.00	0.00	0.31	247867	1581463
358	0.2	0.30	100000	1.20	1.00	0.00	0.00	0.37	204784	1727357
359	0.2	0.35	100000	1.20	1.00	0.00	0.00	0.43	170892	1804488
360	0.2	0.40	100000	1.20	1.00	0.03	0.03	0.50	143890	1492545

Table 6: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
361	0.2	0.20	120000	1.20	1.00	0.00	0.00	0.24	304220	1476805
362	0.2	0.25	120000	1.20	1.00	0.00	0.00	0.31	248137	1648076
363	0.2	0.30	120000	1.20	1.00	0.00	0.00	0.37	203749	1694263
364	0.2	0.35	120000	1.20	1.00	0.00	0.00	0.43	171602	1771268
365	0.2	0.40	120000	1.20	1.00	0.04	0.01	0.50	144906	1702860
366	0.2	0.20	140000	1.20	1.00	0.00	0.00	0.24	305554	1529701
367	0.2	0.25	140000	1.20	1.00	0.00	0.00	0.31	247750	1598590
368	0.2	0.30	140000	1.20	1.00	0.00	0.00	0.37	204193	1693381
369	0.2	0.35	140000	1.20	1.00	0.00	0.00	0.43	171408	1641143
370	0.2	0.40	140000	1.20	1.00	0.28	0.00	0.50	145433	1735303
371	0.2	0.20	160000	1.20	1.00	0.00	0.00	0.24	304464	1555134
372	0.2	0.25	160000	1.20	1.00	0.00	0.00	0.31	247405	1603272
373	0.2	0.30	160000	1.20	1.00	0.00	0.00	0.37	204103	1720075
374	0.2	0.35	160000	1.20	1.00	0.14	0.00	0.43	171899	1779651
375	0.2	0.40	160000	1.20	1.00	0.86	0.00	0.48	152569	1778705
376	0.2	0.20	180000	1.20	1.00	0.00	0.00	0.24	304989	1461835
377	0.2	0.25	180000	1.20	1.00	0.00	0.00	0.31	247997	1624152
378	0.2	0.30	180000	1.20	1.00	0.03	0.00	0.37	204008	1714643
379	0.2	0.35	180000	1.20	1.00	0.71	0.00	0.43	175754	1755549
380	0.2	0.40	180000	1.20	1.00	0.99	0.00	0.45	163286	1704143
381	0.2	0.20	200000	1.20	1.00	0.00	0.00	0.24	303965	1512568
382	0.2	0.25	200000	1.20	1.00	0.00	0.00	0.31	247359	1612582
383	0.2	0.30	200000	1.20	1.00	0.33	0.00	0.37	204729	1717408
384	0.2	0.35	200000	1.20	1.00	0.98	0.00	0.40	185560	1725085
385	0.2	0.40	200000	1.20	0.96	1.00	0.00	0.43	172609	1704646
386	0.3	0.20	0	1.20	1.00	0.00	0.00	0.24	303831	1543636
387	0.3	0.25	0	1.20	1.00	0.00	0.00	0.31	247787	1732660
388	0.3	0.30	0	1.20	1.00	0.00	0.00	0.37	204593	1730838
389	0.3	0.35	0	1.20	1.00	0.00	0.01	0.43	171532	1661313
390	0.3	0.40	0	1.20	1.00	0.00	0.17	0.50	139993	1364014
391	0.3	0.20	100000	1.20	1.00	0.00	0.00	0.24	303897	1495340
392	0.3	0.25	100000	1.20	1.00	0.00	0.00	0.31	246812	1583119
393	0.3	0.30	100000	1.20	1.00	0.00	0.00	0.37	203949	1610086
394	0.3	0.35	100000	1.20	1.00	0.00	0.00	0.43	170910	1710024
395	0.3	0.40	100000	1.20	1.00	0.09	0.09	0.50	142020	1382512
396	0.3	0.20	120000	1.20	1.00	0.00	0.00	0.24	303890	1464406
397	0.3	0.25	120000	1.20	1.00	0.00	0.00	0.31	247606	1567586
398	0.3	0.30	120000	1.20	1.00	0.00	0.00	0.37	203310	1746388
399	0.3	0.35	120000	1.20	1.00	0.00	0.01	0.43	170248	1639071
400	0.3	0.40	120000	1.20	1.00	0.12	0.04	0.50	144041	1678627

Table 6: *(continued)*

scn	n.cv	Ftrgt	Btrg	ierr	aboveFtrgt	belowBtrg	belowBloss	F	S	Ccum
401	0.3	0.20	140000	1.20	1.00	0.00	0.00	0.24	303815	1511884
402	0.3	0.25	140000	1.20	1.00	0.00	0.00	0.31	247733	1664575
403	0.3	0.30	140000	1.20	1.00	0.00	0.00	0.37	204369	1597996
404	0.3	0.35	140000	1.20	1.00	0.03	0.00	0.43	170632	1589068
405	0.3	0.40	140000	1.20	1.00	0.34	0.02	0.50	145155	1913362
406	0.3	0.20	160000	1.20	1.00	0.00	0.00	0.24	305641	1580135
407	0.3	0.25	160000	1.20	1.00	0.00	0.00	0.31	247996	1651817
408	0.3	0.30	160000	1.20	1.00	0.00	0.00	0.37	203847	1608568
409	0.3	0.35	160000	1.20	1.00	0.22	0.00	0.43	170961	1673258
410	0.3	0.40	160000	1.20	1.00	0.79	0.01	0.48	152793	1873633
411	0.3	0.20	180000	1.20	1.00	0.00	0.00	0.24	304824	1657232
412	0.3	0.25	180000	1.20	1.00	0.00	0.00	0.31	246618	1524594
413	0.3	0.30	180000	1.20	1.00	0.06	0.00	0.37	203884	1689765
414	0.3	0.35	180000	1.20	1.00	0.66	0.00	0.43	175770	1617067
415	0.3	0.40	180000	1.20	1.00	0.98	0.00	0.45	163441	1888778
416	0.3	0.20	200000	1.20	1.00	0.00	0.00	0.24	303659	1473581
417	0.3	0.25	200000	1.20	1.00	0.00	0.00	0.31	247368	1618557
418	0.3	0.30	200000	1.20	1.00	0.35	0.00	0.37	205507	1704782
419	0.3	0.35	200000	1.20	1.00	0.93	0.00	0.40	185376	1689744
420	0.3	0.40	200000	1.20	0.94	1.00	0.00	0.43	172979	1805082

## 5 Final thoughts

The plots with the risk analysis give a wide perspective of the risks of exploiting the stock at specific levels, taking into account the interaction with the  $B_{trg}$  candidate. The analysis clearly show that there are pairs of values that have a high probability of driving the stock to unsustainable levels.

The levels of implementation error do not change the wide perspective, although the increase in implementation error tends to require lower  $F_{trgt}$  and  $B_{trg}$ . In any case a level 20% implementation error shows that certain pairs of  $F_{trgt}$  and  $B_{trg}$  are not robust.

The successful candidates must assure  $B_{trg}$  is above the S/R break point and an exploitation level that is consistent with  $B_{trg}$  considering the stock dynamics.

European Commission

**EUR 25275 EN – Joint Research Centre – Institute for the Protection and Security of the Citizen**

Title: Testing the robustness of HCRs applied to Baltic pelagic stocks - Working Document in support to the STECF Expert Working Group 12-02 Management Plans - part 1

Authors: E. Jardim, I. Mosqueira, C. Millar & C. Osio

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**Abstract**

This Technical note contains the Working Document “Testing the robustness of HCRs applied to Baltic pelagic stocks”. The Working Document was drafted in order to support the work of the STECF Expert Working Group (12-02) on the evaluation of multi-annual fisheries management plans.

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